The other terminal for IBM and ICL mainframes

<u>FERRANTI</u>

NEWS IN BRIEF

ICL to spend £500,000?

ABOUT £500,000 may be spent shortly by ICL on production equipment for semiconductor nanufacture at its West Gorton facility. ICL has confirmed that it is currently evaluating different equipment in the ion implantation and mask making areas, and industry sources say the cost could be £250,000

According to ICL, the equipment will be used to speed up the design turnround of complex LSI devices (CW, March 2).

£2m Trainer system

AN order worth £2 million has been placed with Ferranti by the Canadian Department of National Defence for a large Action Speed Tactical Trainer system. It will leave 14 cubicles for trainees, an instructor's control and be based on two FM1600B computers. It is to be installed in the Canadian Forces Maritime Warfare School in Halifax, Nova

Mael price out

REDUCTIONS by Computer Ancillaries Ltd to the prices of its Maei 4000 commercial minicomputer systems mean that a con-Iguration with an 8K processor. a VDU; a four Megabyte car-only a few months and has not formed in addition to the read tridge disc drive and a 120 chps yet announced any orders, and write capabilities of Ranprinter now costs £12,975, including the company's Oasis software package.

Easypay seminar

A SEMINAR on the Eusypay oureau payroll service is to be held by the Gordon and Gotch Computer Group at its head-quarters at 32-38 Scrutton St. ondon EC2 on June 21. Introduced two years ago, the service currently processes payrolls for 170 employers.

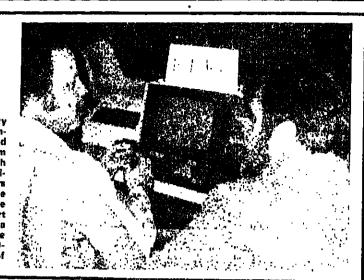
Introducing Adam the Younger....

THE Logical Machine Corp, founded by British entrepreneur John Peers, was overwhelmed by response to the new Lomac machine, Adem the Younger (plantered right) at the NCC in Anaheim. This is a compact desk top, 16-bit processor built around eight into 3000 2-bit bit-eliced micros.

Backed by two floody drives

supporting a 110 chps printer, phrases can be stored on disc for a number of operators, the voice in ultra-high level near natural prints being loaded into the ZBO-language, and cells for under al 5,000. Three people were ready the individual operator.

Backed by two floppy drives muchine while their hands are giving a total of 2.5 Mbytes, and busy. Up to 16 words or short



US offers low-cost rival to ICL Cafs

Contents Addressable File Store has been developed in the US by a Yale university professor. It can turn a microprocessor into an advanced parallel pro-

Starting at only \$525 for an 8K byte system, the REM S-100 was developed by Dr Sydney Lamb, initially for use in linguistic and speech recognition research.

The REM can be plugged into an S-100 bus to link to a micro and firmware is available for the Zilog Z-80 and Intel 8080 at a cost of \$35.

shown when it was demonstrated at the National Computing Conference, at Anahelm, California, last week.

A spokesman for the company told Computer Weekly that, although there have already been inquiries from Europe, it had no immediate plans to market the system outside the US until it had developed production facilities to meet the US

Dr Lamb's technique is called REcognition Memory, which he Or Lamb's company, sion of ROM and RAM. With REM, recognition and multi-nia, has been in existence for only a few months and has not conducted to an extended vertage of Rem.

Anglia's Level 66 passes benchmark

THE Honeywell Level 66 main-time, and resilience tests, it inframe ordered by the Anglian volved some two and a half Water Authority in preference man-years of development to an ICL 2960 has successfully effort. completed a rigorous benchmark well within schedule.

run by Logica, formed part of ting the structure of the the contractual conditions for acceptance of the system. Including throughput, response

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to Accounting Systems

representing to the mainframe simultaneous activity on a net-work of 80 user terminals. dual 66/10 configuration, was placed last year (CW, April 28, 1977), following a long-running and much-publicled dispute.

UNDER a contract worth vices Ltd, the central computing E250,000, the UK microcomputer service for the consortium. Each manufacturer Trivector System 80 computer to a consortium of 14 sugar estates in Mauritius for a Data prepared on the System 80.

data preparation application.

One major task was the construction of a dummy IDS-II The benchmark, designed and database, accurately represenauthority's data. Logica also built a terminal simulator

> The order for the system, a The controversy arose over a authority's governing board. the selection Subsequently, Honeywell equipment.

at Mauritius Computing Ser- exhibit at Compec Europe.

June. 1976).

Sweet success for Trivector

The first four System 80's 2903/30 systems at MCS. have now been installed, two at Trivector says that the sugar estates and the other two Mauritius order follows its

took action in the High Court and the Court of Appeal to prevent the authority from signing a contract with ICL (CW, 24

Honeywell's case was inspired partly by the fact that the published criteria for selection had not included country of origin, and partly by the fact that Level 66 is in any case munufactured at its plant in Newhouse,

afford or do not have access to

It can recognise functions in-

greater than or equal to, and

ables information to be written

in one operation.

Although the legal actions were unsuccessful, the authority invited the original four manufacturers to bid again and appoint a new technical sub-"buy British" vote by the This evaluation again resulted in committee (CW, Oct. 28, 1976). the selection of the Honeywell

Data prepared on the System 80s will be processed on dual ICL



NCR strike threat

THE threat of industrial action by 800 field engineers at NCR, which has hung over the comvolving comparisons such as pany for almost two weeks, has been averted following a the multi-write capability en-ables information to be written ASTMS representatives last week (CW, June 8).

into multiple storage locations The stumbling block had been Although the REM is said to over the salary scales to be have more limited capabilities adopted for a proposed new job than some more elaborate grading, and it was on this that associate memories, its applicaagreement was reached protions potential is similar to the visionally last Friday. It only ICL Cafs—information retrieval remains for the field engineers from large databases, weather and bubble chamber analysis to vote on the union recomand fingerprint recognition. But its low price brings it into the

mendation of acceptance The grading plan is to be inroduced because of the reach of research projects at "dramatic" change in NCR's establishments which cannot products since 1973 when the job plan currently in force began

operation.
"This new plan will bring salary structures more in line with our current products," sold Paul Williams, industrial relations manager of NCR, "It also gives the engineers a much bet-ter career plan and allows for more sophisticated performance appraisal procedures. After the neeting on Friday I don't believe that there is any danger of industrial action."

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MOST PROGRESSIVE

SOFTWARE HOUSES

Doubts on

NEB's

memory

venture

siderable scepticism

THE plan by the National Enterprise Board to set up a

semiconductor memory plant (CW, June 1), has met with con-

The NEB deal was worked out

with New Business Resources of

Dallas, Texas, which acted for a

group of engineers working in the US semiconductor industry.

They will provide the manage-

ment backbone for the new

company, and are said to consist

mainly of British expatriates, So

far, however, the only one named is Dick Perritz who slong

with New Business Resources,

was involved in establishing

Mostek, one of the companie

that are likely to be into 64K

RAM production at about the

same time the UK venture is due

Commenting on the NEB plan

Jack Akerman, managing director of Philips' subsidiary Mullard, said the cost of setting up such an LSI plant was likely to be nearer £500 million than £50

million, and others have sugg-

ested that that is "just an entry

US sources indicate that's

sultable wafer fabrication plant

would cost between £14 and £17

million, with assembly and

rescarch and development costs

The NEB will have to fac-

political problems. Firstly, much

of the investment seems likely to

secondly, assembly of the chips

is usually done in cheap labour

areas such as Taiwan.

go to the US manufacturers of

on top of that.

production

to get off the ground.

Number 606

Computastars at

the Palace

Thursday, June 22, 1978

THE final of the Computastars competition is to be at Crystal Palace on Saturday, September 30. Book the dato — It'll be a great day out

for the DP department, or bring the family along to see the climax of the biggest athletics contest ever organised for computer people.

Proving how popular the event has become, last Sunday's North of the Thames heat at Willesden Sports Stadium attracted more competitors than ever before. There were 31 men's teams and 12 from the woman, the largest number in any bast so far, with some

from the women, the largest number in any heat so far, with some keen contests in the various events.

Overall men's winner was Patrick Kamara (left) an operator with

Midland Bank, and the girls' winner was Gayle May from Case, There will be a full report of the heat next week. South of the Thames report — page 16. The Computastars competition has been organised by John Goldsmith Computer Services with the support of

Price 18p



Briefing

FERRANTI

First UK Amdahl V/6 THE first Amdohl 470 V/6 to be

installed in the UK is now in operation at Kay and Co of Worcester, the mail order subsidiary of Great Universal Stores. The Amdahl machine was chosen in preference to an IBM 3033 and will take over work now run on two 370/158s.

Another prospective cus-tomer is the Leyland car division, BL Cars, which is considering ordering the biggest Amdahi machine, a 470 V/7.

NEGOTIATIONS are under way for the sale of Racal Electronics' South African subsidiary for £8.25 million, Racal has not commented on the plan, but observers believe that the that retaining the subsidiary might prejudice sales in other African countries.

Licensing idea

LICENSING of engineers should be handled by the Engineers Registration Board of the Council of Engineering Institutions. according to the CKP's recom-mendations to the Planiston Committee investigating the engineering profession. The council also recommends new four and five year degree courses for engineers, with the extra year consisting of training industry, for students aiming for managerial posts.

IBM profits

IN the UK last year IBM increased its pre-tax profit by 27% to £10 million on a turnover of £788 million, which itself was up 17%. Profit after tax was £56.0 million, and £30. million of this was added in resource. was added to reserves. Exports accounted for about half of the business at £263.7 million.

3000 ipm printer

A LINE printer that can run at 3000 jpm, the impact 3000, has been introduced by Documation The 1884 by Documation tion. The IBM compatible Impact 3000 has an integral microprocessor based controller and employs an alloy print hammer that brings contact line down to 17 millionths of a second. Characters are held on a plint band that can be changed less than two minutes.

Prestel test

THE local authorities management services and computer committee. Lamsac, is to be-ministed information provider of the Post Office Prestel viewdata saveler it will particulate in the sast service to determine whether the system will prove a more effective help of distributing information to local authorities than esting phalmels.

lipse backets

A WORD processing software and personal personal process in the personal personal

Insac ready to buy US firms AFTER a nine-month gestation period, the assault member, Systime, is not at present seeking to enter in channel capacity and a 40%

on the US software market by lusae, the National the US market. Contracts in the fields of interactive Enterprise Board's subsidiary, is about to bear fruit. graphics, X25 packet-switching technology and Negotiations for three major developm, at con-language technology are likely to be signed shortly. I tracts are near to conclusion, and in the first tracts are near to conclusion, and in the first tracts are near to conclusion. The contracts we are negotiating for our talking to several US software houses with a view to the first real in the \$3 million to \$5 million range. a takeover. Insuc has been seeking a major development contract for each of its three software to three years," he is Horrocks, senior vicehouse members, CAP, SPI and SDL. The fourth president, Insac Group Inc. told CW.

increase in processing speed.

It is expected that the AS/5 will have sufficient capacity for

the ESRIN service until 1982 but there are options for upgrades

Low-cost French

A PARALLEI, processor that signed for use with a SEMS costs considerably less than Mitra minicomputer. This is ICL's distributed array proces- claimed to make the total cost of sor (CW, April 13), has been introduced by Cimsa, an affiliate more than about 1.2 million of the French minicomputer manufacturer, SEMS.

French francs.
The design of

Patrick Kamara, men's winner.

Called Propal II, the system now coming into production has an array of 128 processors. compared with 4,096 in the DAP that ICL plans to sell. Each processor in Propai II has 16K bits of memory, while the DAP processors will have only 4K bits. Data can be transferred be-

tween the Propal processors in 0-bit streams. The 128-processor Propal II

costs 600,000 FF (about 270,000) compared with £500,000 for a 4.096 processor DAP, and while 2900 mainframe, Propal II is de- Service.

The design of Propal II is such

that it could be expanded to have 2,048 processors, each with a 16K-bit memory, which could make it considerably more powerful than the DAP in cer-

Services up

COMPUTER services worth 272,4 million were said in the fourth quarter of 1977, bringing the total for the year to £265.5 million, up 20.3% over 1976. ling to the intent bulleting he Government Statistical

turers who need specific soft-ware products but do not have the resources to develop them "A contract will be signed with the US company in Insuc's

major: US hardware manuac-

name, and we will then fund the UK member company we select for the task during the development period. Our return will be in the form of royalties from the US company. Commenting on the plan to

buy US software houses Hor-rocks said: "UK companies are specialised in specific techno-logies, whereas US companies tend to be very specialised particular market areas.

"By means of acquisition, we hope to build up a group to take advantage of both UK and US specialisations. But the first thing we are after is the instant sales force and ready-mademarket that US acquisitions will bring us. We would normally leave some equity in the hands of the principals, but we are

COMPUTER WEEKLY'S INSIDE NEWS

To been ar buy? This is a decision det fice's colorated users when det fice's colorated users when additional equipment has to be acquired. In this week's feature is to section various espects of Meeing and the second hand market are consected (Pages 13/15). Attachment (Pages 13/15). Attachment (Pages 13/15) and connection mentions technique as a winning Companions with a restriction restriction from the development of the restriction and machine as a second of the development of the restriction and machine as a second of the development of the restriction of the development of the restriction of the development of the restriction and machine as a second of the development of the restriction of the development of the restriction of the development of the restriction of the development of the developm

group on far (page 12). In a Guest Chessial David Cablender of CDC, reports on the Netfolk mathi between Grand Master Walter Cali for world ... between Grand Master Walter Browne and a Cyber (76 which and dith a surprising result (page 20). In another of the prise winning Computatoryle 2000 easays. John Carrett forecasts some of the developments that may stem from the use of sights information and machine intelligence (page 17).

telécories authority
Weibh opt for 2872s
Dojenthine
Microscore links at Layland
Michie's Privatevies
Programmer Notes Programmer Notes
Puzzler
Bofforers File
GTL adds to 8000 Series
Honsywell expends in City
Computations in the South
Papple in the news

Privacy report delayed

FURTHER delays are holding up completion of the report of the Data Protection Committee, which is working on proposals for computer privacy legislation. The report is now expected to be completed and submitted to the Home Secretary by the end of

Members of the committee have apparently been experien cing considerable difficulty in agreeing what to recommend. There will probably be a minority report appended to the final text.

The Data Processing Management Association, soon to be the IDPM, has protested about the delay, saying that it is costly both in time and money to the association's members, who will be responsible for implementing any subsequent legislation.

and is said to give 100% increase A conference on computer privacy, organised jointly by the DPMA and the National Council for Civil Liberties, which was to have been held in November, i now planned for January, 1979,

APEX asks TUC to look at impact of micros on jobs

A CALL for the setting up of a TUC sponsored working party to look into the impact of microprocessors and microelectronics on employment has been made by the Association of Professional, Executive, Clerical

Opyle May, the girls' wit

ESA installs

TO improve its online informa-tion retrieval service, the

European Space Agency has installed an Itel AS/5 Model 3 at

Frascati, Italy. The three Mbyte machine replaces an IBM 360/65

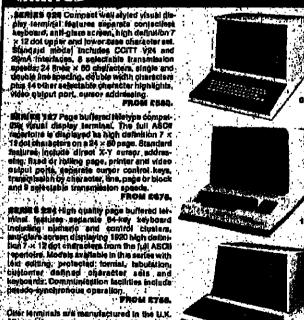
Itel AS/5

and Computer Staff, this week. The union has sent a letter to TUC general secretary Len Murray outlining its proposal, indicating that the working

party should look at the next ten

to 20 years.
"The present arguments around the correct strategy to be adopted with regard to the UK manufacture of inicroprocessors is obviously of importance," said an APEX spokesman, "but for more so are the changes which microelectronics will force Turn to page 2

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London conference by Richard Currier, marketing vicepresident of Altergo Inc.

We should, he suggests, forget about E-series and H-series, and

COMPUTER

Vol. 24 No. 606 Thursday, June 22, 1978

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Class Ad Manager Brien Durrant 01-261 8597

IPC Electrical Electronic Press Lnd. Dorset House, Stamford Birest, London, 827 SLV, Telephone: 01-201 5000, Teleghone: 01-201 5000, Teleghone: 71-201 5000

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Controlled Circulation Department: EPC Business Press (Sales & Distribution) Ltd., 40 Beeding Green Lane, London EG18 DWE, Yel: 61-827 3538.

Sock wenters can be nad as available for sup-pasting.

Computer Weekly has a circulation each wask of over \$2,000 including the highest fully requested circulation in the UK. The international edition. which is published 10 times a year, has a circulation of over 84,008.

through the eyes of IBM, is an irresistible topic for any speaker and a guaranteed attention. Leading into the An original and challenging thesis on the subject was presented to Shadow II users at a lender conference by Pichard

concentrate on word processing

Systems Network Architecture inefficient typists the tools to or IMS are scheduled, he deduces that IBM is hard at work re-writing them with a word processing slant and a 1980 deadline. He suggests that the result will be software which marries word and data processing, leading to an IMS database simultaneously used for text storage and numeric retrieval. Satellite Business Systems, in

which IBM has a one-third into the era of the electronic stake, is a major element in Currier's thesis. Satellites, he suggests, are really costjustifiable only when they 3750 telephone-switching systransmit large volumes of data

with some 50 per cent of the ink-jet printers.

MOST DPMs would acknow-

edge the importance of security

Most would also agree that their

own installation security pre-

Time is all too often the

cautions are less than adequate.

limiting factor. Next in line of

obstacles to good security is

human ingenuity. Operating

routines are prime examples.

and short cuts are almost

Weekly, then its a case of "one

Often, DP management is

content to have set-up security

rules. Subsequent obedience to

the rules is left to the good na-ture and intention of the DP

that it can make its next fortune Noting that no new releases of out of giving those charmingly improve their productivity.

> His idea of a large company's entire filing system being retained in some enormous electronic filing cabinet is probably quite feasible, given the phenomenal rate of decline in the cost per bit of hardware.

There is plenty of evidence that IBM is preparing to lead us office. It is noteworthy that the company demonstrated to the Press in Nice last year that the tem could become the missing link in an electronic mail net-Currier believes that IBM, work of word processors and

Centre security team out in

For the NCC, computer life is

Installations are besieged by

terrorists, marauders, sabot-

eurs and vandals. Disasters,

catastrophies and espionage

lurk round every DP corner. DP

personnel are variously labelled

as being potential villains.

malevolent, negligent or just

Equipment is not exempt. The configuration is vulnerable to

sundry catastrophes and dis-

Given the opportunity, no

doubt the NCC would like to see

statutory legislation and licen-

sing imposed on us all. In the

meantine, the NCC security

specialists have produced what

could well be the ultimate in

security guidebooks, "Manage-ment Handbook of Computer

Security". Perhaps a more

practical title would have been

What every DPM should know

Ray Ellison's NCC team has

but is glad he doesn't."

go overboard on any one pro-duct or scenario; IBM never does. Currier contends that transaction processing and time sharing are passing fancies, but IBM's history suggests that it can be relied on to continue to offer strong products for these

the E-series should not be writ-

ten off. There is little doubt that

it will be with us within months.

As for the H-series, something

fairly enormous will be required

to store all those files, even if the

One development under way

at IBM not mentioned by Cur-

rier, but perhaps relevant to his

thesis is the System R relational

database, reported to be under

test at Boeing Computer Services. System R sounds like just

the thing for the company which has everything and needs to

sider the cost is itself a barrier to

to installation security while the

not made clear.

structured on indexing.

The NCC has recently floated

the idea of developing a full

both users and suppliers. This

seems long overdue, the US

having had such a service for

some time. As a part of the NCC

scheme, the security handbook would be issued and regularly

updated for subscribers. Both

ventures - the book and the

security service - should be welcomed by the DP industry.

security. And just what happens

keep track of it somehow.

team. Such practices would the superlative class. At £80 a

bring the National Computer copy, the DPM might well con-

databases are distributed.

markets for as long as the fad persists — and indeed, is curtariffs and equipment was one of rently emphasising the VSPC time sharing software. of the Brussels Mandate. It is certainly worth keeping : close watch on IBM's strategy in the office products market, but

It took place in London last week and was attended by legal academic institutions and other and communications experts suitable bodies. from organisations on both sides of the Atlantic, including the UK Post Office, the French PTT and the US telecommunications

of world



JOHN EGER . . . the club should have three main alms.

composed of constant threats. DPM is immersed in the book is and telecomms expert. John Costs have never been one of Eger, one time telecomms adviser to Presidents Nixon and Impact of the more notable traits of the NCC, and this volume is no exception. The price of security is

He came up with the idea of an informal club for influencing micros on jobs nover mentioned, except in terms of "after it happens" the Online conference on transnational dataflow, held penalties, is there, for instance, such a thing as an average cost in respect to annual budgets for DP security? The book is heavy earlier this year in Brussels — user areas — from the effects of hence the name, Brussels Man-word processors and con-date. munications technology on on check lists but typically un-

the first meeting, Eger told Computer Weekly, "Part of the purpose of this meeting was to define the role of the Brussels computer security service for Mandate, and the consensus was that the club should have three main aims.

"One of these is to have several ongoing meetings each year at locations all over the world with no more than about 30 attendees at each. Typically, half of them would be telecommunications consumers, like multinational companies, another quarter government representatives, and the

remainder academics. "As time went by people from the developing countries could be drawn into the meetings along with smaller telecomms

telecoms authority telecommunications authority liberations public knowledge by to rationalise and standardise having the minutes of communications laws, taxes, meetings generally available.

Call for setting up

the possible future develop-ments discussed at the first full countries relating to things that "The third aim is to initiate meeting held under the auspices affect transnational dataflow like privacy. The actual studies would be carried out by

"The meeting also decided that there was a real need for a much clearer distinction to be made between different kinds of internationally transmitted The meeting was organised by the Washington-based lawyer as a commodity from information in the broader humanitarian' sense.

"But before we can persuade national governments to change their telecommunications laws and tariffs, a lot more people need to be involved in this de-

Multinational companies with representatives at the London meeting last week included Control Data, Digital Equipment, Unilever, Manufacturers Hanover Trust, American Express and Massey-Ferguson. Some of the other organisa

tions represented were the Home Office, the Inter-Bank Research Organisation, the US Senate Foreign Relations Com-mittee and the Italian intergovernmental bureau for infor-

white collur employment to the automation of skilled and unskilled manual functions."

No other unions have yet been approached for their views on e proposal, but this will probably happen if the TUC Genera Council gives it the green light at its meeting next week.

A NEW generation of Hewlett A year after Compute Packard's powerful multi-programming HP-3000 series Weekly called for an urgen public examination of the like has been announced. Called effects on society of microelec-tronics, the Prime Minister has asked the Central Policy Review main memory capacity quad. rupled to one Megaword, and a which has now virtually new version of the MPE banded (CW, March 30), is to Staff, the Think Tank, to study the social and economic impl cations of developments in the hanced data management facilcomputer Industry.Computer Weekly's call for action follows a weekend conference jointed Hewlett-Packard says that insponsored with the British Chapter of the Association for

throughput of the largest Series II model with 256K 16-bit words.

Use of the new memory chips cuts the main memory cost per bit by 48 per cent, and the same price reduction is offered by a

pack, allowing any pack to be used as a private file. PLANS to enter the market for Prices range from \$77.050 for a operating a oftware. 50 hetabytes on disc, tape drive and console, to \$153,770 for a Megabytes on disc, tape drive. Obol and networking software. The venerable HP 2000 limeshere system of interesting and system with 240 limeshere system, introduced in the being developed that incorporately interpreters and system as well as of the company's Austin, Texas, plant, says a \$4K bit ROM is being developed that incorporately interpreters and system as well as calcording to Daniels, few micros plant, says a \$4K bit ROM is being developed that incorporately interpreters and system as well as calcording to Daniels, few micros plant, says a \$4K bit ROM is being developed that incorporately interpreters and system as well as calcording to Daniels, few micros allow position independent code. This is an important factor for without it the device manufacturer becomes involved in the design of the system as well as design of the system as well as design of the system as according to Daniels, few micros of the components. Currently, the components currently design to Daniels, few micros plant, says a \$4K bit ROM is being developed that incorporately interpreters and application appears to use with the device manufacturer becomes involved in the design of the system as well as design of the system as cacording to Daniels, few micros of the components. Currently, the components controlled in the components of the components. Currently, according to Daniels, few micros of the components. Currently, the components of the components of the components. Currently, according to Daniels, few micros of the device manufacturer becomes involved in the appearance of the system as well as design of the system as well as design of the system as well as the components. Currently, according to Daniels, few micros of the components. Currently, according to Daniels, few micros of the components. Currently, according to Daniels, few

rlude an examination process- at Dataskil's system centre in ing system for the WJEC as Reading where, under a facilities well as fines, tees and maintenmanagement contract, it is being readied for its start-up later this year. Initially, the system will handle the general financial

years on....

YOUR profession is now 30

years aid — younger than many Computer Weekly readers. This

week zees the 30th anniversary of the start-up of the world's

first stored-program computer the Mark I at Manchester Uni-

It was on the morning o

June 21, 1948, that the Mark is the brainchild of Fred Williams and Tom Kilburn, first went into operation. Professor Williams died last year; Professor Kilburn

is now an FRS, senior professor of computer science at Manch-ester, and pro-vice-chancellor.

The Mark I can still be seen

with its successor, the MUS.

Vietnamese-born Thi Truong.

R2E is looking for a turnover

of FF28 million this year, up

from FF22 million in the year to

opened a US subsidiary i

darch, 1978, and has just

Thirty

Presently, the 2970 is located

British Rail for £975,000.

Cardiff City Council 2972 will provide computing services to South Glamorgan and the Vale of Glamorgan Borough Council. requirements of the authority The system will also support but Southwark eventually hopes to extend its computer facilities terminals in schools throughout the county and in the South to personnel records, social ser-Glamorgan Institute of Higher vices, and planning and design applications.

Weish Joint Education Commit-tee, plus a number of schools system which it bought from

Cardiff's machine, valued at £1.7 million, will be installed in March, 1979, and will feature 3 Mbytes of memory and 10 disc drives. The Mid Glamorgan system will be installed in June. 1979, and will have 10 Mbytes of memory and 14 disc drives. It is: valued at £1.9 million.

Swiss companies seek to buy

Sy Tim Palmer

SEEKING to take advantage of an extraordinary seems, to assure clients that they are dealing not with swiss software companies wants to buy a UK soft-build software companies wants to buy a UK soft-build software companies wants to buy a UK soft-build software.

Once acquired, the software nouse would in immediately cease trading in the UK, and would in the use the Swiss group, which consists at 14 companies trading in France and Germany as well as switching in France and Germany as well as switching in France and Germany as well as says that it is already holding talks with a software which is in liquidation. RAS says that the infertal the British company would be selling is whole idea has been discussed with the inland

is name, registration.

Its former owners would be free to set up a new company with a different name and continue in valley in Switzerland where taxation is very low, is business just as before, and would be paid "yood also planning to go into personnel recruitment in a big

It may seem a little strange that anyone is prepared to pay good money for little more than a name, but it appears that if a company is registered in the UK but reds only overseas, it is not subject to UK company will also be face from tax in the countries in which they operate.

Why not simply set up a new British company

Welsh councils opt

and county council technical

departments. Applications in-

ance for magistrates' courts.

for ICL 2972s

Education

name of UK software house

Once neguired, the software house would customers.

mame, registration and reference list of clients.

money" by the Swiss group.

ment by Oxfordshire County

Council (CW, June 8), that it is

to install an ICL 2972, two other

local authorities, Mid-

Glamorgan County Council and Cardiff City Council, have said they are to follow suit and

lace their ICL 1904S systems

The orders are worth £3.6 mil

lion to ICL and both computers

vill support a wide range of

At present, Mid-Glumorgan

County Council provides a

remote job entry service to Ogwr, Rhondda, and Taff Fly

borough councils and its other

terminal users include the South Wales Police Authority, the

in former owners would be free to set up a new

The Oxfordshire County Conneil 2972 will provide computting facilities to all five districts in the county and it has been estimated that the switch from an R.L. 1904S to a 2972 will result in a saving of more than £500,000 over seven years. This system will have 2.5 Mbytes of mais menter.

• The London Borough of HP-3000 Series III, it features Southwark, one of the founder low-cost lekt-bit memory chips. niembers of the Joint London Borough Computer Consortium,

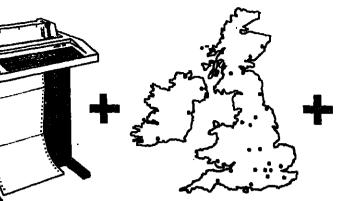
CII-HB takes control of house benchmarks of the Series Ill weighted towards database inquiries and updates; indicate that it offers at least twice the throughput of the last twice the throughput of the last twice twice twice twice the last twice MOVING us planned into the its share of R2E to about 60%,

minicomputer and terminals but the company will remain taken a controlling interest in independent under its founder, French microprocessor pioneer R2E. The move has given the new 120 Megabyte disc drive, up to sight of which can be attached to the Section of the sight of which can be attached to the Section of the sight of which it needed for expansion

The MPE-III operating system enables faultiple terminals to be stacked either locally or famplely to each port for the like it into the large in the local port for the large in the local port for the large in the

speed database updating and indexes each removable disc pack, allowing any pack to be plans to enter the market for employing firmware coused as a private file.

Prices to enter the market for employing firmware countries as a private file.



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Telephone No.

standard. But in any case if strict adherence to installation rules and regulations were followed, the complete system could end up in a dead end, well and truly buffered. Users would not be

Suberthinas for readers existe the above categories, the year, UK £14.50, oversées £20, USA, Canada £52, Etudents £7.30, oversées £18, USA, Canada £52, Etudents £7.30, oversées £18, USA, Canada £32, Etudents £7.30, oversées £18, USA, Canada £22, Etudents £7.40, Etudents over keen to know the reason for the non-delivery of vital reports: that two operators have to remain in the machines room at all times. If one op leaves to collect stationery, back-up discs or the latest copy of Computer

ISSN 0010-4787

GOVERNMENT COMPUTING

MINISTRY OF DEFENCE DG SHIPS, BATH

An information retrieval and data capture system able to input and output ICL 1900 compatible tapes (9 track PE 1,600 BPI) in the first instance, later to ICL 2900, to replace an existing-manual card system. It is expected that three keystations, a printer, a processor capable of user programming and up to 10 M.bytes of file storage will be regulred for installation in January 1979.

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Ten years

COMPUTER WEEKLY JUNE 20, 1968

IN SPITE of opposition, a com-puter "with significantly better throughput than Atlas" was to throughput than Atlan" was to be built at Manchester University with the help of a \$650,000 grant from the Science Research Council. Evidence produced by computers was to become admissible in Scottleh civil courts under two new clauses proposed by the government in the Law Reform (Scotland) Bill: Flight testing of the EAC 111.500 series sirliners was being helped by the use of an Elliott 903 computer. Air Canada placed a digital display systéms order worth £12 million with Raytheon for a seat reservations and communications system.

fingerprints by conspictors using pattern recognition techniques was being studied at Strath-clyde University A dominated a strate of the controlling the distribution of nesural gas developed by the Gas Council.

Ray Ellison's NCC team has indeed produced a masterpiece: Unfortunately the price is also in 'NCC, 280, INTERRUPT

ONCE upon a time a very large British company was proudly, and nervously, demonstrating its new sales application to all the important people in selling from its offices all over the UK.

This was in the days of the immortal IBM 1401, and just about the first big application this very large company had there including a very young,

and very raw, programmer.
In the middle of the invoice hun the entire system stopped for no apparent reason. Team leader Frank and all his men ran round in circles looking for clues until, having reached that state of desparation when anything will be iried, somebody hit the start button on the line printer, and it all went like magic from

Nobody ever knew that the young raw programmer had been leaning on the line-printer and had bumped the stop button with his elbow; nor did he ever say— until today.

The Moral-Keep them out of the computer room while they still don't know where their elbows are.

elbows are.

This precise 25 Interrupt Prize some to Gerry Herrison of Bellagi.

"A second basic aim of the Computing Machinery at Hedsor Park (CW, July 14, 1977).

read

Laser Printer: See page 13

The other monks were horified, appalled. They chastised their colleagues severely for making such an outrageous suggestion. Nowadays, of course, we realise how primitive and irrational they were. Nobody thinks like that

General Motors in the technical manuals may be difficult to read, has devised a computer program that calculates the average sentence length and word length in a plece of text and comes up with an index of "readability."

Keeping : it clean

IN the world of high technology, keeping it clean is a serious busi-ness and the latest ald for keeping mucky people and clean com-ponents apart is this chic little number from Tak Chemicals.

number from Tak Chemicals.

The one-piece romper suit for adults is, I am told, made of a special non-woven fabric which is a much better bargain than more expensive waven material, and there are tunics, trousers, anoraks and other gear to suit the occasion. As well as proteoting the lad inside from all sorts of industrial hazards Confitak—that's what it's called—will also that's what it's called -- will also retain "body and undergarment debris".

And after a herd day at the lab you could trot off to a fancy dress ball as an abominable snowman.

FIRST heats of a worldwide micro-mouse contest, organ-ised by the institute of Electrical and Electronic Engineers were held at the NCC at Anahelm. Contestants build a mouse from micro components and it has to find its way through a maze.

Although over 6,000 people have entered the 1978 com-

equipped with a stowaway spare tire, your spare is designed to provide you with more usable interior space. The spare is located in a deflated condition resulting in a

spare tire, your spare provides you with more usable storage space since it is stored de-

a computer, you read it. States, suspecting that its up for writers who have no aesthetic sense of how to comdeflated condition" and are paid for it is painful.

Why don't they just say it Manuals that score badly are rewritten (by a human being).



Of mice and machines.

throughout the year.

etition, the organisers ex-

reduced overall diameter."

After rewriting, it became: "If your car has a stowaway

The mind reels. If you want to know if something is readable, you don't stick it through Writing style is a wholly subjective thing, and no amount of computer analysis will make municate. The thought that there are people at GM who write phrases like "located in a

pected only about 600 eventually to turn up with the work-able mice at heats to be held

At Anahelm. many of the entries failed to reach the starting gate and there were many iborted runs. One mouse, for example, kept getting as far as the first bend and then going

THERE will be significant progress on the development of standards for open system interconnection during the next fortnight with meetings being held in Washington, Paris and London by three specialist groups

working under the auspices of the International Organisation for Standardisation. UK participation in these studies is the responsibility of a British Standards Institution committee known as DPS/20. This

At the recent meeting of ISO/

TC97/SC16 in Washington, the

sense of urgency generated a

welcome spirit of international

co-operation and a realisation

nat, to be more manageable, the

ubject should be divided into

three smaller areas. These three

sub-groups will cover all the

subject matter of the UK wor-

Over the years, the approach

computer operating systems

taken towards the construction

has gradually evolved to become

one in which individual func-

tions are performed by well-

defined modules or groups of

modules. The overall structure is

"layered" in such a way that the

functions provided by one level

can be utilised by higher levels.

article emphasises the need for standards in this area and outlines the technical approach being taken, it was prepared on behalf of DPS/20 by a group chaired by Dr Roland

Standards for open system interconnection

is the notion that any computer program, terminal or user may communicate meaningfully with any other. The advances being made in computer communications technology now make such a concept feasible but only if the appropriate standards can be specified and universally adopted. This article outlines some of the benefits to be derived from open working technically feasible and and describes the work being undertaken by the standards organisations towards this end.

The property of "openness" is intrinsic to any general com-munications medium such as the postal and telephone services. The advent of new public data networks creates the possibility of extending such openness into the area of computer systems. This could lead not only to enhanced usage of existing facilities but also to the introduction of a wide range of payments. of a wide range of new applications such as the "cashless society", electronic mail and home computing. Users will be able to access an ever-increasing number of services from the same terminal equipment; information will be readily ex-changed among different machines; tasks may be per-formed by partitioning them for execution on several cooperating computers; databases and access to them may be geographically distributed.

Historically, it was the need to access powerful mainframes and centralise databases which stimulated the development of computer communications sys-tems. This led to the concept of the familiar star network with a number of remote terminals around a central computer. Within such a closed system, the computer determined its own rules to be obeyed by all the terminals and intelligent devices requiring access. The result has been a proliferation of proprietary conventions which have very little in common with each

themselves on the conventions to be used. But such bilateral arrangements become unmanageable and expensive as the number of interconnections increases, thereby severely limiting the range of applica-

Advances in computer and communications technology now make distributed systems economically attractive. However, whereas standards in areas such as card codes are a convenience when decks are moved from computer to computer, open system interconnection is absolutely impossible unless the appropriate standards are specified and implemented.

If standards are not agreed quickly then pressures from powerful customers will force manufacturers to adopt less than ideal de facto solutions. The telecommunications industry which sees in open working the possibility of immense extensions to its business realises the importance of standards in bringing this about. The administrations of the new public data networks have indicated through their international organisation CCITT that they might take their own steps if there is undue delay by the standards bodies.

The British Standards Institution was among the first to realise the importance of standards for open system interconnection and last year proposed to the International Organisation for Standardisation that the subject merited the establishment of specialist sub-committee. The roposal was accepted and the ISO Technical Committee 97, which handles standards for computing, set up a new group with the formidable identifier ISO/TC97/SCI6. To co-ordinate the UK participation in this work, BSI/DPS/20 was formally established as a sub-group of the other,
Two parties wishing to exchange data or to access shared

DPS/20 is now actively engaged in its work and has identified an initial set of topics to be studied

Dr Roland Rosner is a principal scientific officer at the Rutherford Laboratory and a member of the Network Unit of the Computer Board and

> Further, no level need be aware of the detailed mechanisms for achieving functions at any other level. This allows the construction of the system to be underent software is avail. structure."

Research Councils.

under study for open system interconnection follows a simiar layered approach. The main levels so far identified are an applications layer; a transport service which offers a secure nects the transport service to

the transmission medium.
The relationship between the omponents in a given layer and their opposite numbers at the other end of the communica-tions facility is called a protocol. In particular, the components in the applications layer comthe applications layer communicate by means of high level tion for this purpose. This note is
protocols. The structure described allows these high level the first of its kind and further scribed allows these high level protocols to be specified in a

of the nature of the transmissio medium, which could be, for example, on X25 network.

The operation of a protocol

begins with the establishment of a channel along which informa tion is to flow. This is follower by a negotiation phase when the rules governing subsequent in teractions are agreed. During the transfer phase, data is exchanged together with signals which assist in the control of errors, synchronise the data flow or permit the rules of the dialogue to be modified. The end of the transfer is effected by terminating the dialogue and closing the communications

DPS/20 is concerned with the specification of the transport service and the applications

Areas of study are: Refinement of the model: One of the DPS/20 specialist groups is studying the details of the model with a view to specifying a unified set of concepts and definitions which will form the basis of the other studies.

The Transport Service: An other group is concerned with the functions of the Transport Service and the definition of its interfaces with the communications and applications layers The nature of the Transpor Service when the communi tions medium is an X25 network vill also be studied.

High Level Protocols: The components of the applications kiyers will be subjects of study for a long time. DPS/20 is in itially concentrating on basic protocols upon which more Inborate structures may be

File transfer protocols permit the transmission of bulk data among computing systems. Several such protocols have already been defined including contribution from the UK High Level Protocol Group. These are being examined with a view to extracting the best features of

minal has been developed to blems caused by incompatib ities among the large number of available terminals. Its purpos is to make it unnecessary fo components in applications layers to cater for the details of the particular terminals which they are communicating

specific protocols, a study closely related to the elaboration of the model, is in progress on the common features of all high level protocols. If these can be determined, it will be easier to define and implement future

Because the issue of open system Interconnection has only reports will be issued as the work properts.

MICROWAVE links providing data communications at 56,000 bits per second are part of a network that connects more than 30 factories and depots of Leyland's BL Cars group to a data network that connects into the control is and depots of Leyland's BL Cars group to a data centre at Redditch, near Birmingham. The centre, which was officially opened on Monday, is taking over mainframe processing work handled until now by machines that include twin IBM 370/158s at Cowley, Oxford; an IBM 370/145 at Solihull, Warwickshire; and an IBM 370/145 and 370/158 at Longbridge, Birmingham.

When the centre at Redditch

is fully equipped by the end of the year hardware there will

include one six-Megabyte IBM

3033 and four machines transf-

erred from other locations -

There will also be a total of

20,000 Megabytes of online disc

storage on 80 Memorex remov-

the spindles and 12 Memorex

Cars the biggest Memorex user

Memorex for the processors that

front end the network and to Data 100 for the 30

minicomputer-based remote job

users with what BL Cars calls

he used for time sharing by de-

velopment personnel at various

locations, for dutabase access

and for text processing. To sup-

port these applications the systems at Redditch will run TSO,

Time Sharing Option, IMS, In-

formation Management System and CICS, Customer Informa-

tion Control System, as well as

Data 100 terminals.

Hasp, which controls I/O for the

A microwave tower on top of the Redditch centre provides

voice, facsimile and data links

with almost all the locations in

the BL Cars network, while or-

dinary Post Office land lines

Bl. Curs says that it is one of

the few privately licensed users

Stockport

and Gwent

magistrates

MAGISTRATES' courts in

Stockport and Gwent are to be

among the first courts to implement ICL's recently released

Magistrates' Court System.
Stockport Magistrates' Court
is to use an ICL 1904A system
operated by Stockport Metro-

witun District Council to run

he package, and court staff will

access the system via three ICL 7561 VDUs installed at the court

in Europe.

two 370/158s and two 145s.

NEWS IN BRIEF

LT £50,000 modems order

TO use its private telecommunications network for data transmission, London Transport has placed a £50,000 order with IAL for dial-up and permanent link modems.

At present data transmission is via Post Office modems on the public switched telephone net-

NCR additions

THREE additions to its 7750-2000 family of proof and encoding systems for banking have been announced by NCR. Known as the 7750-2300, 7750 2400, and the 7750-2500, the new models offer increased power and additional capabilities to NCR 7750-2000 series users. They are stand-alone systems which can be upgraded to operate as workstations for the NCR 7750-3000 distributive document processing system

Standards agreed RECOMMENDATIONS on

standards for the exclusing of bibliographic information have been agreed at a symposium in Sicily, between representatives of abstracting services, libraries, the ISO, and the UN. The Sym posium agreed that a common exchange format should consist of a record structure, content designators, and data elements. and that the record structure should be accepted as the existing ISO 2709.

Plessey venture

TWO Plessey companies.
Plessey Ireland and Plessey
EAE, formerly East Angillan Electric, have been appointed agents for telophone, telox and facsimile terminals communicating via Marisat suteiites operated by Comsut General of Washington DC, and working on offshore oil exploradon around the coast of Ireland. Plessey will market, install and maintain the terminals.

Prime installation

and linked to the main computer GECS, the Liverpool-based through a 7502 terminal procescomputer bureau, has installed a sor. This system will eventually Prime 300 system for use in replace a Burroughs visible batch and time sharing applicarecord computer.

It will also help to clear a tions. The bureau offers a range puting services to companies, and has developed commercial, mechanical and electrical en-

of microwave transmission systems in the UK. Some doubt was cast upon the

future of the Redditch centre early this year after British Leyland chairman, Michael Edwardes, announced his intention to return to separate operating divisions within Leyand Cars (CW, January 19). However, Leyland pointed out fixed head units, making BL at the time that the centralised system had been designed to support any type of organisatio-BL Cars has also gone to

Cowley service section of BL Cars are now using the en-hanced IBM 3270 display system entry terminals that provide introduced last year (CW, June 2, 1977) to edit and format text "decentralised control", even for handbooks and repair though the mainframe hardmanuals. The three 3278 VDUs that form part of the system can About 130 other terminals will each show 3440 characters.

Technical authors at the

FOLLOWING its form lier this year (CW, January 19). Data Recording Equipment now has a managing director. He is John Armatrong, form erly managing director of GEC-Elliott Process Instruments Ltd.

Armstrong has also joined the board of Data Recording Instrument Co which controls DRE and two other companies, Data Recording Heads and Newbur Laboratories. DRE embraces a the operations covered by DRI before its status was changed to that of a holding company. Pro-ducts manufactured by DRE in-clude floppy and cartridge disc drives and matrix printers. WHILE investor confidence in ding that ICL is confident that shares tending to rise with the no fundamental problem exists market and to stand firm when it falls, two stockbrokers' reports and that the government is satisfied with the steps that have on the company take strongly een taken in the three or four Quilter Hilton Goodison & Co installations where problems commends its clients to hold

Conflicting views

on ICL shares

contradictory views.

profits for the full year of £37

It rates the first half perfor-

mance — pre-tax profits of £15.8

million on turnover of £232.1 million — as creditable, given

the industrial relations problems

of the October to December

quarter, says that real growth

the increased interest charges

(£5.8 million in the half-year) to

stockbuilding of 2950s and 60s for delivery later this year and

It also puts into perspective

the adverse government report

have arisen. the shares, noting an encou-raging outlook for the second half of the company's financial year and forecasting pre-tax The view from Scott, Goff Hancock is decidedly bleak, and recommends clients to take advantage of further strength in the share price to reduce their

"The bulk of ICL's problems lie with its software development programme, and profits reported are largely due to ware is less'important. Our fear is that price cutting will ultimately extend to this market segment, especially as IBM will be launching its new E-series

"ICL should report a useful pre-tax profit increase this year, still fraught with considerable uncertainty," it concludes.

large 2900s, pointing out that it ICL shares broke through the is "by no means unusual for 300 pence barrier last week. early installations of a com-They stood at 206 pence at the beginning of the year. pletely new computer to en-

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taken by several groups working in parallel, provided only that the interfaces between modules and levels have been rigorously specified beforehand. A further. advantage is the ability to eplace modules and levels when hardware is changed or when able without disrupting the total The basic model currently

transmission path to the applications layer; and a communications layer which con-

cach for synthesis and expansion into a possible standard.

The concept of the virtual ter-

In parallel with the work a

recently gained wide pro-minence, DPS/20 recognises the need to produce some de scriptive material about its work for the wider community like to be interested in or affected by the topic. Accordingly, one of i

outstanding fines. Magistrales' courts in Gwent will use an ICL 2903 system with gneering software. five 7502 and two 7181 terminals to run the software package, and the order is valued at £150,000. Bisouit system The 7502's will be installed a BISCUIT makers Chiltonian of South London has ordered a 200,000 122k byte Ctll 8050 to 2003 in Newport Police in Newport and processing and stock and in Blackwood and Pontypool will use the ICL 7181 terminals.

magistrates' clerke' offices in

service company for lawyers

NEW company. Oyes Companiers, has been formed to handle all the burner and systems development servicing provided for hydrare to the succing have Stricture Tocalety. In applicable, if sell-market the resistiving have Stricture Tocalety. In applicable, if sell-market the resistiving have succeeded and no long a photology system.

Other services evaluable one many-posticity and service packages that you have been succeeded by secondaries and services seek and the services are seek by secondaries and committee development.

Perform transport producing and supplies assures and admire development.

just like a Grandmaster

cluding its small memory requirement. Within this condensed space it deploys a repertoire of

pattern-based rules, constraints and goals, and

handles this small but tricky problem like a

master. We hope to teach it to do a good deal

The king-rook-king-knight database com-

prises some 3½ million legal positions. Addition

of another two or three pieces to the board

would create endings for which database con-

struction would not be feasible because of the

combinatorial increase in size of the problem

space. For such endings an "expert system" is

the only possible approach.

With so many enticing applications for "expert systems" in geology, medicine, botany, chemistry and other branches of applied

science, why chess? Such a game is surely a

parlour accessory rather than an instrument of

article. Let me here only list four fundamental

questions on which research is needed: (1)

machine representations of human knowledge,

(2) numerical measurement of knowledge thus represented, (3) methodology for ensuring and

certifying reliability of expert systems and (4) conversion of knowledge refined by machine into human-usable forms. These basic ques-

tions can make fastest progress, in my view, if applied studies are coupled with "test-tube"

For these, chess is ideal, not least because for

more, than a century highly trained human intellects have done the best job they could at intensive refining and codification of this particular domain of knowledge. If we believe, as I do, that computers have given us a new trick, by which vastly improved codifications can be made than it behaves us to use for comparison

made, then it behaves us to use for comparison

the best specimens of the pre-computer art that

The first autocodes were tested using "test

tube" arithmetic. So in the development of new

species of knowledge-handling languages ex-periments with the re-codification of chess skill

To answer this would require a separate

better than the average master!

serious business

IT IS not customary for this column to eat its

words. Today, however, I think that a judicious

In my fantasy of the British Cabinet attempt-

ing to discover in 1986 what is meant by

"expert system" I said that "not a single centre

in the UK is engaged in such studies"

(Privateview, March 30). These smart and

useful programs are proliferating with gusto in

America and Japan. I have, for example, noted

in this column Todd Wipke's program SECS

among others. SECS acts as an intelligent

assistant to chemists desirous of planning ways

of synthesising new compounds (Privateview,

However, I overlooked the North London

Polytechnic where they have mounted the chemistry program LHASA, described by its British co-developer Dr A. P. Johnson as "superior to SECS in many aspects of its performance". The work is an off-shoot of Professor

Corey's laboratory at Harvard University in the

US, where Dr Johnson spent a sabbatical year.

The Science Research Council contributed the

graphics facilities needed to run the program

Almost everybody tends to confuse "expert

systems" of the SECS and LHASA kind with

very large databases of useful scientific facts.

The difference is that you can only answer a

question by reference to a database if the

answer is already stored there. An "expert

system", which may itself enjoy access to one

or more databases, answers questions by reasoning and intelligent conjecture. What it stores consists not only of individual facts but also of more general patterns, rules and

"theories", by means of which it infers its

Together with our own miniature "expert system" for chess endings at Edinburgh (also

leveloped with assistance from the Science

Research Council) we have access to a data-

base for the complete sub-game king-rook-

king-knight. Tim Niblett has used this database

to show that the expert text on this ending,

prepared by a great Grandmaster before the

computer era, is seriously incomplete and

The expert system for this same ending

differs from the database in many ways, in-

over here and continue its development.

January 19).

eating of the word "not" may be in order.

DEC launches TP system for PDP-11s

Il range. As a result, one system

developed by DEC for a specific

Special Systems Division. Intro-

SOFT BITS

Accounting

A RESOURCES accounting

package has been produced by ICL Dataskil for 2900 users run-

ning under VME/B. The pack-

age processes data in the VME/

generate resource utilisation

the definition of installation

charging rates, so that invoices

can be raised automaticulty. In

together with explanatory text.

addition, ancillary charges, such

accounting journal to

The routines also provide for

system has been introduced by scale IAS operating system. A gital Equipment for the PDP- special terminal, the VT52, is minicomputer family. Called offered by DEC for use in pro-Trax, an essential component of gram development only. the new system is DEC's first block-mode intelligent terminal, designated the VT62.

SOFTWARE FILE-1

Trax runs on the 11/34, 11/60, and 11/70 supporting 16 ter- inquiries. Mainframe comminals simultaneously on the munication options include 11/34 and up to 64 terminals on emulation of 3271 protocol. an 11/70. User application Trax fills a long-standing gap in DEC's software for the PDPlanguages supported are Cobol and Basic Plus 2.

The VT62, a new microprocessor-based VDU, is customer has already been used to provide basic screen adopted by the company's handling and data validation functions. Programmed in an duced earlier this year (CW, English-like Applications Ter- January 5), TPM 70 is said to minal Language (ATL), the ter- have no direct relationship to minal relieves the central pro- Trax. cessor of data validation tasks.

Transmitting data to the PDP-11 in blocks - rather than character-by-character - the terminal reduces processor overhead and enhances line

Although re-entrant, the central Trax software is not described by DEC as multithreading. Rather, the system is intended to support a large number of small transaction modules, each of which will handle a single message.

By implementing screen handling and data validation routines in the terminal, contention for CPU-resident tasks is significantly reduced, explains the company. In critical areas, the CPU overhead can be further reduced by loading more than one copy of a frequentlyaccessed module.

in support of TP operations. the system includes facilities for restart/recovery, data protection, file organisation, and record access.

Trax incorporates its own operating system, rather than being built on an established DEC system such as RSX or RSTS. The system thus requires a dedicated machine.

However, facilities are included for concurrent program transparent ERCDIC mode, and opment and batch proces- a 3270 protocol handler running sing, the latter being described as a system task.

70 with intended for a more specific environment than Trax, being particularly suitable for applications written in Fortre The system also includes r Assembler. built-in communications op-

Users have also been active in tions, enabling several Trax indeveloping TP monitors for the stallations to exchange data and

The most recently announced system was that developed by Lloyd's of London for its 11/70 installation (Software File, June 8). Logica has also developed TP software for the PDP-II which it has supplied in embedded sys-

A TP system was among the presentations at the DEC User Group conference in San Diego last autumn and a Norwegian user is also understood to have developed similar software.

A SMALL business systems group has been set up by Soft-ware Sciences to specialise in small IBM systems, such as the System 34 and the 6110 desk-top computer. The group, built around a nucleus of nine commercial analysts and programmers, will provide the full range of system design and implementation services.

A DATA preparation service has been introduced by Sharpe Bennett Associates, based on its old offices at Lancing, Sussex Formed 215 years ago to design terns for small-to-medium as for data preparation; can be computers, the company las included on reports and invoices moved to 1 Aldsworth Paids.

Goring-by-Sea, Sussex Tel: Worthing 503848. A NEW package from SPL is designed to facilitate the con-A GENERAL ledger system de nection of remote polled tersigned for financial manage-ment has been launched by K3 minals using 3270 protocol to a PDP-11 running under RSX - Software Services, of Worcester, 11M. The software, written in Written in Cohol, the package Macro 11 assembler, consists of will probably be of most interes a DVII driver handling a binary to existing mainframe of synchronous line in non-minicomputer users, says the minicomputer users, says the

company. K3, a subsidiary of

Kalamazoo, was formed carller this year (CW, January 12).

SOFTWARE FILE -2

EDITED BY PETER HEWITT

COMPUTER WEEKLY, June 22, 1978

Program exchange scheme likely to be opened to all A SCHEME for the exchange of educational programs is likely to open its doors soon to include individual in addition to institutional members. Originally a project with a company of the library, a further four programs or project with a company be selected for the library, a further four programs.

The Central Program Exchange, previously

sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics. For the sed at first in chemistry and physics at the sed at first in chemistry and physics. For the sed at first in chemistry and physics are sed at the sed at

Originally a project within the National Development Programme in Computer Assisted Learning, CPE, was established almost five years ago known as the rhysical Sciences program Exchange, is also broadening its range to include angineering, mathematics, computer science, bloomy, and management sciences.

log, and management of the CPE offers members a program library currently containing around 175 items, in exchange for a £25 The Exchange, which of the state of computer assisted learning, special-boad area of computer assisted learning around 175 neems, in exchange for a £25 figure and the special-boad area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer assisted learning around 175 neems, in exchange for a £25 figure area of computer area of broad area of computer that and physics. Not to be initial 30 programs; each further program taken

NDPCAL, now meets half its operating expenses from subscriptions and receives the remainder as a grant from the Council for Educational Technology. The Council has yet to approve the extension of the scheme to the personal computing frater-

If given the go-ahead, CPE is likely to offer a offering 10 initial programs for a subscription of

Around 100 of the current programs are written

Compower

addition

of software offered by the National Coal Board's Com-

may be selected free of charge.

The scheme, previously 100% funded by

Dr Beech, and conform the scheme, according to

Programs submitted for inclusion the NDPCAL are tested by CPE on its own machine and sent for review to an acknowledged expert in ? subject area covered.

Starting in September, the CPE is to publish a series of booklets describing the programs available in each subject area. Dr Beech noted that the scheme is thus offering academic recognition to program authors for the first time in the history of

CICS users complain to Price Commission

plained to the Price Commission over IBM's increase in the annual rental charge. The complaint has been lodged by the UK CICS Guide group, a sub-

group of the users group Guide.
The programming group of the IBM Computer Users' Association has also voted in favour of pursuing an appeal. The two bodies are thus in effect taking joint action against the

Users were upset because the price rise, from £5,000 to £6,000 per year, coincided with a iction in the level of support Previously included as a programming product in service group B, the software now

receives class C support.
The complaint relates only to OS Standard and DOS Standard versions of the TP monitor Although also the subject of a price rise, CICS/VS is still still ported at the same level and has recently been significantly upgraded.

The Price Commission has UK CICS Guide Group, es- asked IBM to provide written timated that about 50 UK DOS justification for the increased charge and is still waiting for a users were affected and around six OS users. The standard DOS response from the company. version was widely used under

power subsidiary is a system for the design and evaluation of multi-ended pipework systems. IBM announced the price in-The system, Pipestress, k DOS/VS, he said, particularly by crease last July, to come into available on the Compower net-work under a marketing agree-ment with Babcock and Wilcox, which developed the program installations with only a few effect in January. At around the terminals. Such sites saw little same time, it also gave notice of advantage in investing in the the forthcoming change in sup-

Simplifying the interface with VSAM

A SOFTWARE package designed to simplify the interface to IBM's VSAM has been a general-purpose module with a adopted by a South Coast con-sultancy for marketing in the UK. The software, Vsamio, was developed for a major Swiss bank by Utesia AG and is said to have been installed at 40 sites in Switzerland, West Germany and

conversion to CICS/VS.

Vsamio supports all three sequence, according to the contypes of VSAM data set, pany in addition, for Cabol replacing IBM's more complex—users, it eliminates the need for

VSAM offers a number of

single entry point, the VSAM operations required are specified using link area parumeters. The interface enables inexperienced programmers to make full use of VSAM facilities without having to master the cumbersome IBM calling

reduction in the frequency of file Marketing agent for Vsamio in the UK is RAS Systems Design, 48 Portland Avenue, Hove, Sussex. Tel: 0273-411109.

throughput advantages over

ISAM, including reduced access time degradation as files become

disorganised, and a consequent

developed by Harris anguage processor for Basic have been developed by Harris

Computer Systems for the Series 100, 200, and 500 machines. In contrast to Harris' existing Basic, the new version functions both as an interpreter and a compiler. Called Basic-V to signify its operation in a virtual

APL interpreter

memory environment, the processor is re-entrant and also generates re-entrant application Several users may thus share the same copy of the language

processor or concurrently execute the same copy of an application program.

Basic-V includes a number of

interesting and unusual language features. One of these is the capacity for variable names up to 31 characters in length, in contrast to the great majority of implementations which allow nly a single letter optionally followed by a digit.

Greatly improving program legibility, the facility for longer names has so far appeared in

such is Hewlett-Packard's implementation for the new System 45 desk-top computer which permits names including up to 15 characters. Another is a commercial Basic developed by Logica for the Tandberg TDV 2100 terminal (CW, February

facilities for matrix and array handling, including functions for matrix inversion and cross product generation. Arrays, which may have up to 255 di-mensions, are limited in size only by the maximum virtual memory storage.

The processor also includes a powerful range of character string handling functions and full range of integer, floating point and complex functions.

Claimed to be both consistent with, and a superset of, the forthcoming ANSI standard for Basic, X3.60 — 1978, the software runs under the Vulcan. operating system and is priced at £3,000.

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PROGRAMMER NOTES

Some approaches to problem-solving

basic concepts of Lateral outline Thinking such as de Bono's use

Honald Talie

ruzzier

"If BOY asks GIRL to be his wife, When both are in the 'prime' of

And LOVE exists, but not much Then they will certainly

No this is not Poet's Corner, but merely my introduction to this week's cryptarithm

LOVE + ELOPE

Both BOY and GIRL are prime numbers. See page 53 for solu-

LAST week's Programmer approaches to finding solutions Notes introduced some of the using the methods already

The first of these techniques is of random juxtaposition in pro- called by de Bono General There are four overall gritty implementation details.

There are four overall this approach concentrates on the basic themes focusing where all the basic themes focusing the basic appropriate on considerations of

Cost or time.

Before launching into General
Strategy, one must decide which
variation of the approach is to be
adopted. The first is thinking out
from the problem and seeing
what happens, the other is the
reverse, thinking in from where
one wants to be the target land
attampting to back-track to the
actual problem.

Having decided which
approach is to be taken (or per-

Having debided which approach is to be taken (or per haps having opled for two teams, to cover both variants), the next step is to identify a number of alternative solutions. This is again done in a generalised manner and may involve in methods of provocation of jux taposition in order to generate as many alternatives as possible. Next, try and sidel out all the basic aims of the project. The

objectives of a payroll system might be to pay salaries, collect taxes and national insurance, supply time-sheet costing infor-

alm using various criteria. Such interrogation could, for example, establish the relative importance of paying salaries, collecting taxes and simplifying

manual procedures.
A deliberately introduced provocation, perhaps a random shalogy, can be used to sort out

costing data, rather than attempting to process both together may arise out of seemingly us.

Possibly two systems be used related discussion, or from all instead, rather than trying to article on snother subject.

tion.

After General Strategy, the second technique is Implement think visually may do be ten.

spelling out each possible implementation method, in cluding obvious logical approaches and then analysing

ping area, so what, for example would be the best method implementing a test system other than trying every com

modity in every position?

De Bono's third problem solving method is probably the most confusing. Bated on the notion of an Idea Sensitive Area. ISA (see de Bono calle it) involves d example; an analogy with making an omelette: breaking, an area where having such an including and cooking eggs mea will yield considerable together.

In the payroli case, should the egg, or salary, be kept separate costing data, rather than attem.

"In The Course Of". Useful ideas



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Enhancements to Philips' WP 5001

FIVE onhancements have been introduced for the WP 5001 word processing system.

Communication facilities have been added, enabling the machine to communicate with other WR, 5001 systems over the dial-up telephone WP IBM and with IBM and Philips maintrap of some variable 3770 emulation.

The Cume 28-inch carries of people wanting to the machine of the state of the continuous of the machine of the state of the sta

and accounted notepaper to be fed continuously

Dignition facilities, enabling it to handle output from any typewriter with OCR heads. Offline punching of paper tapes for telex transmission is now supported by the WP 5001, enabling text to be corrected on the screen before it is

committed to tape.

The WP 5000 saries of word processors will be enhanced later this year with the addition of a floppy disc-backed model based on the system developed by Micom, a Canadian company in which Philips has taken an 80 per cent stake (CW, May 4).

CTL adds to top of its 8000 series

Called the 8070, the new machine consists of two 8050 processors tightly coupled together and is claimed to offer up to 80 per cent more power than a single 8050. It runs under the standard Modus operating system which supports concurrent multilingual transaction processing, batch and spooling from both local and remote terminals. Languages available from CTL include Cobol, Fortran IV, Basic, Coral 66 and BCPL. There is also an Algol 68 compiler, and Manchester University has developed a stand-alone Pascal which does not run under Modus.

Redifon wins £2m **'R' orders**

ORDERS worth well over £2 million have already been placed with Redifon Computers for the R range of distributed processing systems that it announced in April (CW, April 13). Customers in the UK include three

More than £500,000 worth of the orders for the R-range have come from Czechoslovakian customers including Bastro, an engineering factory, part of a coal mining organisation in the Ostrava area; and Synthesia, a large chemical factory at Par-

The local authorities which have ordered R-range systems are the London Borough of Lewisham and Rotherham Borough Council, both of which Borough Council, both of which time sharing service, which is are having R300 systems with 12 handled by its Network Inforterminals; and Doncaster mation Services Division.

The new office at 74 Finsbury version of Tabol, which has been Versatec introduces vector to raster converter

AN electrostatic plotter can be driven by a minicomputer at full

The VRC speed using the vector and box unit and has been designed rester converter, introduced by to accept ordered vectors from a the US firm Versatec, which has minicomputer and to send raster a UK subsidiary at Newbury, data directly to the piotter,

An 8070 with 112K 16-bit standard 8030 processor; the words of main memory and 96 Megabytes of disc costs just under £100,000, and can grow to a 224K-word system with 400 Megabytes on disc which, fully configured, costs about £250,000.

"We are competing with the top end of ICL's 2904, but our machine goes much higher," Roger Fulton, product manager at CTL, told Computer Weekly. "We can realistically support 64 VDUs and printers, and with the 8070 and the new 8020, announced last month, we have doubled the available priceerformance of the range, which is field-upgradable right the way

There are two processors in the 8000 series. The 8020 is a new low-cost but fully softwarecompatible version of the

The VRC is a 5½ x 19 x 20 inch

and is now concentrating most of its energies in the business systems market. About half the company's business comes front the commercial sector, with most of the remainder coming from the company's existing base in the educational, medical

8050 adds extended store facilities to the 8030; and the 8070 is

end user, sometimes in partnership with a software house," commented Fulton. "But we are planning to sell the 8020 to systems builders, and are already negotiating one such OEM con-tract for it."

EXPANDING its operations in Pavement, EC2, also houses a developed for the examination

The division has also intro-

duced Tabol 2, an enhanced

taking over the raster conversion function from the com-

The VRC converts vectors to

rasters at data rates of one

the City, Honeyweil has opened training centre and support sers third outlet for the GE Mark III vices for software and financial

"We sell mainly direct to the

CTL hopes that availability of the 8070 will prove an added attraction to people considering products lower down the line,

branches equipped with terand instrumentation businesses. ness, online to its ICL System

Britannia pioneers use i updating terminals PIONEERING the use of frontoffice banking and pass-book

minals attached to Datasaab By June the first phase of the £400,000 contract, announced 18 months ago will be complete, with 49 branches, accounting for two thirds of the society's busi-Honeywell expands in the City

of alternative business

strategies and is designed for use

company set up to sell the net-work (CW, June 15). GE owns

the remaining 84 per cent.

DP exportence.

fordshire. The mainframe is due for replacement in 1979 or 1980, updating terminals, the Britanand a dual 2960 is the likely nia Building Society now has 14 upgrade, but no decision will be

made for a year or so. Datasaab is in line for the contract to equip the remaining 50 branches, and the current thinking is that these will get D5/20 systems running offline during the day, with data being transmitted overnight on the dial-un network in batch.

NEWS IN BRIEF ICL 2950 for patients

ONE of the earliest ICL 2850 installations is to be for Private Patients Plan, the medical insurance group which will take delivery next month. It will replace an ICL 1901T and handle the updating of company group subscriber files. ICL was chosen again because PPP is already successfully using an online system called Computer Retrieval and Entry of Subscriber Transactions which is based on an ICL 7502 terminal processor

Ouicker delivery

NEXT-DAY delivery is now being offered by the Idem Division of Wiggins Teape for Idem carbonless paper and other Wiggins Teape products following the installation of an IBM 370/148 at its Basingstoke headquarters. The £1,25 million system will be linked to warehouse and branch office

Footwear system

TO deal with bought, sales and nominal ledgers a Redac Executive system has been bought by Twinmar, the retail footwear company of St Albans, Herts.

OEM disc drives

A RANGE of fixed media disc drives, the 2700 Series, has been introduced by Storage Technology, which now has an office in London. The three models in the series, the 2707, 2710 and 2720, have capacities of 33, 80 and 170 Megabytes, respectively. They are aimed specifically at the OEM market, and feature a cooling system that enables them to be used in virtually any

Codex buys **Toronto firm**

business managers with no US MODEM manufacturer Honeywoll says that with Codex has gained access to the Canadian market by purchasing Tabol 2 it can offer across-theboard data handling services for

ESE of Toronto.
ESE alroady manufactures a small range of modems, and this will be enlarged greatly by It is introduced as Honeywell takes a bigger interest in the worldwide Mark III operation with a 16 per cent share in a new

the Codex range. Codex will save on the 17 per cent duty which is imposed on imports if a similar product is

LEASING

Survey research

RESEARCH into the compile tion of surveys is to be carried out by a new unit at the Polytechnic of North London, with the aim of developing an inte-grated approach to theory and applications of surveys in the social sciences. Development of software for statistical analysis will be one of its main concerns. Among its work so far has been a national survey of schoolgir pregnancy, and a programme of rescarch into the "quality of life" is planned.

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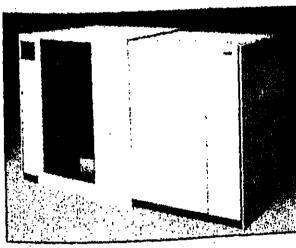
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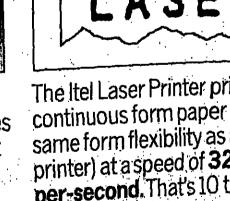
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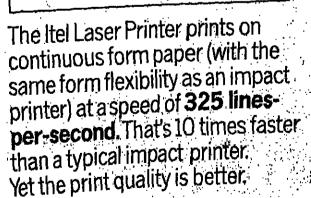
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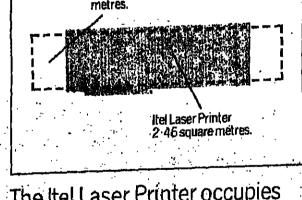
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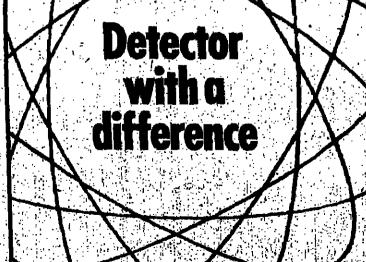


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The Paperless Revolution - part 1. We are using electronics more and more to store process, transmit and display information, Will this new technology take over from paper completely? In the first of a two-part series

Information scientist Anthony Cawkell looks at the latest developments that could affect our lives at work and at home.
Valves versus Transistors. Do valve audio

amplifiers give better quality sound than transistor amplifiers?

wireless WOTE ELECTRONICS TELEVISION RADIO AUDIO

Edited by Martin Banks

NEB sums right for RAMS project

is to be successful

Firstly, can they find the right

"if" is that the process must run correctly almost from day one

This may well prove the hardest, and probably the most expens-

Lastly, will the company be

given enough freedom by the NEB to act quickly in response to the inevitable problems it will

face? Although public money is heavily involved, this will prob-

ably be one company where "public accountability" could

As previously pointed out

(CW, June 8), if all these factors

can be made to come good, the

company will be entering a ma-

jor battlefield in world semicon

ductor markets Already,

Motorola and ITT Semiconduc

tors have joined Mostek, Intel,

Texas instruments and Lujitsu

as declared contenders, with

Hitachi, Toshiba and Nippon

Flectric about to join the fray.

The volume price for 84K

RAMs in 1982 is aircady being estimated at \$20 to \$22 upiece.

This means that the new com-

pany will need to get its process

running well very quickly, if it is to catch a major share.

Realistic estimates of the pro-

blems this poses can be gauged

from the fact that initial pro-

duction yields - the percentage

of useable devices from the total

processed - can be expected to

be under 4%. With perhaps only

10 wafers processed per hour, at

least until the process is running

smoothly and with only one

shift per day - production staff

will need to be trained - the

initial cost per good chip could

mean instant death.

MUCH of the scepticism that ment, and research work carried has been voiced about the cost estimates being used by the National Enterprise Board in its NEB money being spent with planning for a new British UK or European suppliers. semiconductor memory company is based on hard won

MICRO NEWS

In the area of accurately forecasting the costs involved in stablishing a new production peration, the semiconductor dustry has learned that estimates can easily be very

However, despite the quoted opinion of Jack Akerman, managing director of the Philips subsidiary, Mullard, the NEB estment of £50 million seems just about right for the start-up phase. Akerman has gone on record as saying that £500 million would be more like the figwe required, quoting the fact that Philips alone has spent this much on semiconductor research and development.

With companies like Signetics in the US, RTC in France, Valvo In Germany and Mullard in the UK, Philips has a much wider area to spread its money than the new British company, certainly in its start-up phase, and ed sources have indicated that £50 million could be about

Such a sum would be split between establishing a water fabrication facility capable of producing the 64K RAMs the

timated at between £14 mollion and £17 million, assembly and test equipment, and research and development. These last items are difficult to forecust issembly is usually carried out off-shore in cheap fallour areas. but with the quoted estimate of 4,000 jobs being provided in three to four years, it must be assumed that assembly will be done in the UK.

Research and development budgets inevitably require con-siderable elasticity, and long term funding in this area must be an item for consideration by the NEB and the group of en-gineers behind the company. Given the £50 million total budget, it seams certain that much of the initial R&D will alréady have been done.

From this it follows that much of the production equipment ecessary to manufacture the memories will be imported from the US, even though the NEB

> As an example, he said that one problem with diagnostics, was if the fault actually stopped the loading of the diagnostic routine in the first place. The I/O attachment cards in the Series I however, were equipped with diagnostic firmware for self checking, together with checks for the atjached terminal. In this way many of the common errors (the all-time winner, he said,

were checked. He also said that the company

out by the group in such an en- improvements of 10 to 15% vironment points to little of the should be possible fairly rapidly, and additional staff may allow a further production shift. It There are five major "ifs" should then be possible, by the time the market for the mitigating against the new company, which must be overmemories fully develops, to come almost simultaneously if it

> Even if the new company catches a significant share of the market it will require continued investment, either out of profits research. This will be the acid test for the company, for it is an area where others have fallen And as one semiconductor manufacturer put it, "£50 million the market."

bring the price down to perhaps as low as £10-£15.

factory? Vibration will be a problem with production processes required to resolve I micron lines with accuracies or public funds, for new and approaching 1 millionth of an additional equipment and inch. Secondly, can the factory be commissioned quickly, which involves considerable cooperation by equipment suppliers? The third concerns getting the design right first time as may be enough to get it going, but it is only the entrance fee to there will be little opportunity to start all over again. The fourth



Electric is spreading itself more

should be available at around

into the high technology

semiconductor market with the announcement of a 60 nanosecond, 4-bit slice microcomputer, The agreement with Texas and a second source agreement with Texas Instruments for its TMS 3064, 64K bit CCD memory. The bit slice, known as the ductor sourcing Intel, and µCOM 2000 series, is said to be Motorola sourcing Fairchild. ully compatible with the AMD Nippon is currently developing 2900 market leader, and samples

chip, two types of sequencer, six types of bus transceiver and one

Instruments follows other second source deals in the CCD market, with National Semiconthe Texas part, and hopes to have samples available by late 5,000 yen (£10) next month. autumn.



planned by the companies' UK agents, Comart.
'The hotel's Twickenham Room will be taken over tomorrow evening (Friday) when Cromemco users interested in forming a user group can meet at 7 pm, followed at 8 pm by North Star users.

Gall for papers

THE organisers of the Third Workshop on Microprocessor Applications, to be held at Liverpool University from September 4-5, are seeking new papers suitable for presentation at the event.

Likely subjects for inclusion will cover selection trade-offs, software design, testing, and a wide range of applications areas. Submissions should be made to M. J. Taylor, Microprocessor

Workshop, Computer Laboratory, University of Liverpool, PO Box 147, Liverpool.



Gays Preston (above) of the interdate division of Perkin-Eimer (she is secretary to UK general manager Bob Jefferson) puts her back into throwing the frisbee, and Geoff Clark (left) of Lambeth Borough

Biggest turnout from S of Thames

throughout the day for the South of the Thames heat of Computastars made a very pleasant day out for spectators, but a tiring one for competitors, particularly the finalists. With the largest turnout of

teams so far - 26 men's and 12 women's teams - competitors were on the field much longer. To compensate for this, some events were slightly curtailed, but the final results were still not announced before 7.30 pm. Even so, the Croydon Sports

Arena was the scene of some extremely varied activity throughout the day, including cricket ball and frisbee throwing, hockey-ball hitting, drop kicking, goal scoring, sack races and press-ups, in addition to the track events.

One sad omission was the noped-for international element. Scandinavian Airlines had planned to send a team including at least some Scandinavians, but were unfortunately unable to

men's events was Hounslow Borough Council with 126% points. Their team goes through to the final at Crystal Palace in September, with runners up Commercial Union 1 and Robert Horne Computer Services, whose No 1 seed, Tony Osborn, also won the men's individual

Hounslow, clearly anxious to prove that their computer staff are not all brawn, also have a ember of their men's team, Gary Read, in the finals of the national Othello championships. Obviously a highly talented de-

Kensington and Chelsea Borough Council, who won the Plate competition for the "best of the losers," also go through to the finals.

Hounslow Borough Council women's team, which was awarded a place in the final be-cause the individual women's winner was a member, has been withdrawn because it did not conform to the rules of the

winner is now Vai Davis of Commercial Union, the third placed team that was already in The winning women's team

was Rank Organisation's first team with 67 points. Perkin Elmer, pipped at the post with 66 points, deservedly join them in





(Above) Eric Mayris (left) of Parker Pen and Dick Holmes of Commercial Union in the final of the men's 400 metres. (Left) A close finish in the ladies' hurdles final.



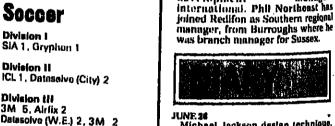


Norprint divides into three THE three divisions of Norprint will become three separate companies as of July 3, and these will form part of the Norcros Group's print and pack

Hoskyns 2. CDC 3

Chairman of the three companies will be Tony Warren, chief executive of the print and packaging division. The directors of the former divisions become managing directors of the

comes NOR Systems Ltd at Harwich, managing director Maurice Wright; and Darley becomes Darley Business Forms Ltd at Burton-on-Trent, managing director Howard Mar-



PEOPLE

COMBINING the operations of

Plessey Memories of Towcester and Plessey Microsystems Inc in the US, Plessey Peripheral Systems Inc has

President of the new company is Melvin Lamph, previously general manager of Plessey Microsystems, and Gerard Mottler, formerly

general marketing manager-

eting manager.

urope, becomes worldwide mar-

Replacing Mottier, Marcel Cor-

eting manuger. Michael Pringle becomes engineering support manager — Europe, and John Klisby becomes administrative manager —

A North of England sales and ser-

vice office has been opened in Manchester. The manager is Duncan

Hilton, until recently a service en-

Brian Oakley has been appointed

secretary of the Science Research Council, succeeding R. St J. Walker who retires on June 30. Oakley is an under secretary

under secretary at the Department of Industry and has been head of Research Division since its inception in 1972.

Nick Blake, formerly marketing director of GEC Semiconductors.

has become marketing manager of Ultra Electronic (Components).

Pete Polizzano, previously regio-nal sales manager with On-Line Dis-tributed Processing, has joined ICL as 1500 product marketing manager.

Jack Letherbarrow, marketing services manager of Adler Business Systems, has been appointed direc-tor of distributive network.

Ronald Hooker, a director of

tronic components, has been

Trevor Hemmington become

solos manager at Terminal Display Systems, Prior to this he was district

nanager of ADP in Birmingham.

ippointed deputy chairman.

lier which manufactures elec-

aboeuf becomes European mar-

Top appointments at

new Plessey company

Dave Brooks, lately of British Olivetti where he was a business systems sulesman, has joined Kode as sales executive, terminal products for the North of England.

Brian Farley, who until recently

was working as a private consultant has joined System Aid at Southalla

customer services consulta

Michael Jackson design technique, Michael Jackson design technique, management tutorial, Marcus Brom-berger, Dept of Computer Science, Uni-versity of Strathchyde. Glasgow. 8.30. Details Mrs Christle, 041-552 4400, ext

Pnince. Diana who was iCT's

manager, and education and

fore suffering a stroke in 1967, was awarded the MBE for her M-

Brian Sixsmith, Southern region

ales manager with Redifor Com

vices to speech thempy.

levelopment

ducation and lisison service

ning correspondent for CW, be

Multi-microprocessor systems. Institu-tion of Electrical Engineers. IEE, Savoy Piace, London WC2. 10.00. Social aspects of machine intelligence. Donald Michie. BCS 1978 Lecture Saries. London School of Economics. London VC2. 19.30.

WCZ. 18.30.

IUNE 27-36

National security and protection exhibition and conference. International Professional Security Association. Granby Halls. Leicester.

JUNE 29-39

JUNE 30-JULY 2 new companies.

The industrial division becomes
Norprint Ltd, managing director

Peter Jurdan the result division becomes

Norprint Ltd, managing director

Peter Jurdan the result division becomes

Norprint Ltd, managing director

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Norprint Ltd, managing director

Peter Jurdan the result division becomes

Norprint Ltd, managing director

Peter Jurdan the result division becomes

Norprint Ltd, managing director

Symposium of database teachers in UK universities, polytechnics and collegatof technology. Dept of Computing Science University of Aberdeen. Aberdeen 920. Details: Dr S. M. Deen, 0224 4024. ext. 8421.

..ONLY VIEWDATA!

by Don



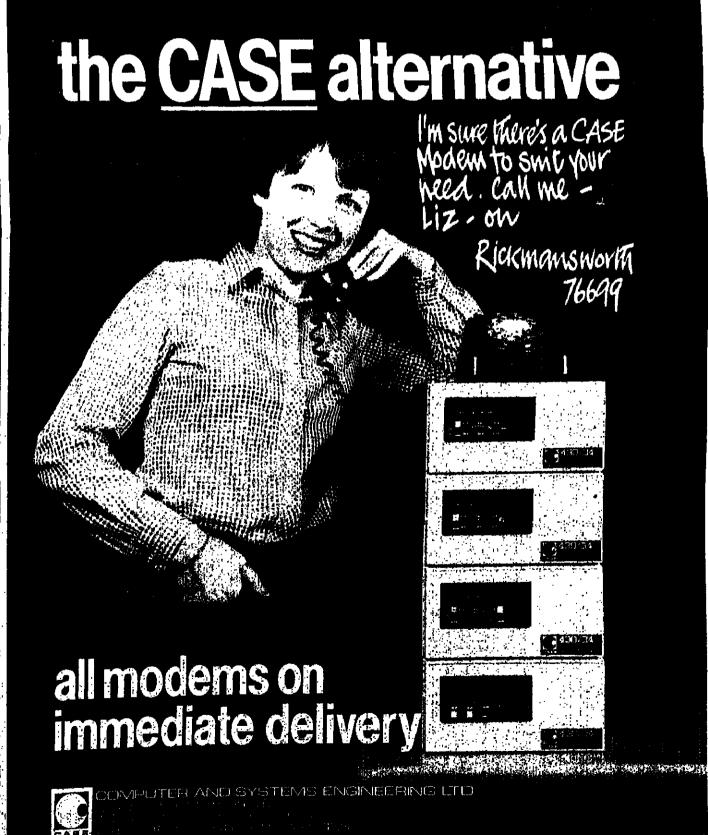
OFF-LOADING functions from the main CPU is one of the prime steas that IBM is investigating in a growing use and applica-tion of microprocessors, and the company is only just scratching the surface.

This was stated recently by Mike Davis, speaking at a meeting of the ECS Micro-processor Specialist Group.
The company is already using microprocessors in its Series is minicomputer.

minicomputer for its 1/0 attachment cards, and is finding that is can get "a lot of mileage" from the application. Not only do they slipp the terminals consisted to the I/O cards to set as smith the terminals when required in the recourse to CPU interestion. Medition but they are also in employed to reduce pro-lems in the maintenance and osls of faults in the system.

was "diskette not losded") could be eliminated before the more undamental parts of the system

naw considerable advantages in reducing the workload for user programmers in organising for-minal communications. "If you split VIAM up with micros, it's amazing how flexible you can be he said, "and you don't need." 5M bytes to hold it."



CANE



المكذا عند المأصل













Can BCS Group fulfil its potential?

British Computer Society is thwarting the operations specialist group in its attempts to attract new members and so fulfil its potential.

Can the group overcome this the group. barrier and develop into a body which will establish an accepted code of practice for operations, and provide a service of practical use to its members?

The answer is "yes", according to Barrie Patman, who is chairman of the group and a senior training consultant with **BOC Datasoly**

He is the first to admit that, since its inception three years ago, the group has hardly set the operations world alight, but he feels that it has an important role to play provided it develops

Dispelling the misguided view that the group is intended solely for the likes of shift leaders and operations managers Patman emphasises that We want to recruit operations staff from all levels in order to fulfil our two main aims - to represent operations as a whole, and to upgrade the status accorded to operations by other sectors of the industry."

According to Patman, the group is concerned about such matters as the lack of job definition, and the fact that the term "operations" has a very iifferent meaning from one installation to the next. "At one site the operations

department takes in the data control, job control and technical support functions, while at others it is concerned solely with he operation of the system."

He adds that much depends on the philosophy of the company involved, and splits installations up into three broad categories:

Firstly, there are the installations where the importance of operations is fully recognised. and where the department is allowed to use the skill, and develop the potential, that exists within its ranks.

Secondly, the exact opposite: I these sites, the programmers are held in high esteem, and the operators are considered to be iust button-pushers.

In the third category, which is nothing like the other two, the installation has drifted into the situation in which it finds itself.

Operators often complain that nobody listens to their point of view. Woll, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to-computer operations.

perations.
Your letters should be sent to Op Spot, Computer Weekly; Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 8038. "It is from the third category that we would hope to recruit members initially." says Patman, "for they are the ones which would benefit most quickly from being involved in

"At these sites the management are perfectly willing to let the operations department develop to its full potential, but neither the operators nor the management are aware of what can be achieved."

Of the group's meetings, which are held about every six weeks, Patman says that they provide an opportunity for operations people to meet and discuss issues of common inter-

I suggested to Patman that since operations staff are often practical in their outlook, the idea of attending meetings to discuss matters is unlikely to interest them to any great ex-

He replied, "The meetings are of practical value, because members have the opportunity to 'pick each other's brains' and so save themselves the time and effort of searching for solutions to problems which others have net and overcome in the past."

But surely there are enough user groups in existence to carry out this function?" I asked. Patman pointed out that the group is concerned not only with matters of a technical nature, but also those such as the recruitment of staff and the planning of shift patterns. He added that operations managers are often faced by problems in these areas and that it is often helpful to discuss them with

other managers. What has the group to offer operators, senior operators and those who are relatively new to the industry?

According to Patman, "It will enable them to put their views across and work towards creating a better situation for themselves. For new recruits to the industry it provides a means of finding out what is available to them in such areas as career

He intimated that some of established unions do not fully appreciate the problems faced by operations staff, and that it is up to operators themselves to see that standards are

Discussing the difficulties faced by the group, he said, "While there is a great deal of potential in the group, it has yet to be fully tapped. Unfortun-ately, the members are sometimes refuctant to commit themselves to positions which will take up a lot of their time."

"But," he continued, "the greatest problem has been letting people know that we are here and that they do not have

4196 8 2 1 1 2 2 2

order to take part in our activ-

In his view, "It is time for the group to gain credibility by being seen to be doing something which is of practical use to people in operations."

In this context, it is currently compiling a "skills register," in which the combined experience of its members will be recorded. This will be circulated throughout the group to serve as a guide to those seeking advice on problems related to their work.

This is a strategy adopted by many user groups in order to "pool" experience. If a person is faced with a particular problem he is able to consult the register and contact someone who will be able to help him.

The operations specialist group has a further use for the register, as Patman explained: "Once this has been completed it will provide us with a guide as to the various needs of the group's members. We can then go ahead and produce papers on subjects which will be of practical use."

As an aid, the group is to use Standards In Operations, published by the National Com-

Said Patman: "We will set up working parties in order to carry out in-depth studies into many

of the areas which are already outlined in the publication. We will probably also be in touch with the NCC to get their

Patman . . . "It is time for the group

Throughout the interview Patman was keen to stress the practical value of the group, but n no way does he discount the importance of its academic side. He advocates that operations staff take at least Part 1 of the BCS entrance examination, for, as he says, "Part 1 of the examination has an operations option, and the last paper I saw had questions relating to plan-ning shift patterns and the role

of the operations manager." He believes that by taking the whole examination operations staff will gain a much broader knowledge of the industry which must be highly beneficial

HINT OF THE WEEK

Place printers offline to avoid confusion

"VERY simple and fail-safe", is how Barry Denyer, a senior systems operator with Barclays Bank in Worthing, describes a hint relating to using printers in a direct mode in the IBM OS/VS environment.

According to Denyer, the devices should be placed in an offline state as soon as they have finished printing.

He says, "We sometimes attach both our 3211 printers to one system and use them in direct mode. To avoid confu-

tem request for the forms con-trol buffer has been satisfied.", At the end of each job step, the printer is de-allocated by the system and the VARY

ommand takes effect. If the job requires the printer in a subsequent step, the sys-tem issues a device allocation message, with an asterisk dis-played besides the address of the printer previously used.

The operator responds to the sion, we enter a vary offline dress of the printer and it is message by entering the adcommand as soon as the sys- again allocated to the job.

CDC launches Series 1 peripherals as the Certainty range

for some time from Control Data (CW, February 23), has now been formally launched as the Certainty Series. It includes removable disc stores, fixed disc drives, a flexible disc system, matrix and band printers and an operator console display station.

The Certainty 270 line of removable disc stores provides 63, 126 or 240 Megabytes per cabinet and comes with a coniroller that occupies one input/ output slot in the Series 1 pro-

The Certainty 230 fixed disc drive series has two models, the 10 and 20, that provide 9.3 and 19.7 Megabytes of moving head storage, respectively, while another two models, the 10F and 20F, each add 0.74 Megabytes of fixed head storage to these capacities.

A Certainty 230 drive can be loaded with the Certainty 210 flexible disc store which has a capacity of 608,208 bytes. Combined with the 230 drives, the 210 forms the Certainty 240 series of disc storage systems.

The Certainty 450 series of band printers uses a horizontal band with 384 characters on it to print at speeds of 360 or 720 lines per minute. A compressed pitch eature enables printing at 15 characters per inch instead of 10. The Cortainty 420 matrix printer can print bi-directionally at 180 chps and provides compressed rinting at 16.5 characters per

The operator console display station, called the Certainty 610. has a mode and command structure similar to the IBM 4979

Water Authority goes to Honeywell

A HONEYWELL Level 66/10 is to be installed by the Northumbrian Water Authority next February, replacing an ICL 1902T system. Honeywell was one of four companies that tendered for the contract, the other three being ICL, IBM and Burroughs, although Burroughs dropped out quite early. The Level 66 system will cost about £1.5 million spread over a fiveyear period.

Bottled up

ROTHERHAM-BASED bottle maker, Beatson Clark, has bought a £250,000 NCR Criterion N-8450 system, which will be used principally to support the company's stock control and

NEWS IN BRIEF

Montpellier

3031 to the Banque de Paris et des Pays Bas in Paris.

Revolution

FOLLOWING its widely reported meeting on the impact of the microprocessor, the In-stitute of Mechanical Engineers is to hold a further conference on the "Computer Revolution," on October 18 and 19, at its London headquarters, 1 Birdcage Walk, Westminster, SW1.

Atomic contract

A CONTRACT to maintain 660 teleprinter terminals at the Atomic Energy Research Esta-blishment at Harwell in Oxfordshire, and at the Culham, Rutherford and Atlas Laboratories has been awarded to Kode Services of Caine, Will-

Computer art dates

of the exhibition of Harold Cohen's computer-produced in (CW, June 8) have been 📭 nounced by the Arts Council They are:until June 23, Polytechnic of Central London August 19 to September 10. South Hill Park Arts Centre. Bracknell; September 25 to October 13, Blackpool College of Art and Technology; October 30 to November 17, University of Hull; February 19 to March 9. 1979, Birmingham Polytechnic; May 5 to 27, Abbotsholme School, Uttoxeter, Staffs.

First from

THE first French-built IBM 3032 and 3031 mainframes have been shipped from the company's plant at Montpellier, west of Marseilles. The first 3032 went to Shell in Holland and the first

Yves Poupon, production manager at the plant, noted that the deliveries met the schedule announced when the products were launched last autumn (CW, October13).

DATES and venues for the low

put together what I believe was

Smartie will be ready for anything in the North Sea MICRO CONTROLS



TO meet the need for unmanne inspection equipment to operate in the poor visibility and hostile conditions of the North Sea, produced Smartie. The name neans Submarine Automatic Remote Television Inspection

The prototype is based or a Motorola 6800 microprocessor with 1K byte of ROM and 128 bytes of RAM. Production ver-sions will use the 6802 chip.

The micro is safried on board Smartle and controls all move ments in response to commands from the console on board the mother ship. The console has a display screep. This shows the view from Smartle, which cal-ries a low-light silicon inten-sified target damera and a vidicon camera...

Difven by an electrical pump, the vehicle is supplied with power and control signals via its umbiliest cord which also catries video signals back to the operator on the surface.

LEASING AND SECOND USERS

MOST third party lessors, as well as used computer vendors, have always favoured igh machines for a whole list of reasons. IBM machines to the maintenance a machine in the future can no longer be that IBM seldom refuses to provide, and the fact that the value of an IBM machine over a neriod of four or five years has always been fairly easy to estimate.

announcements over the last two years of purchase prices. IBM policy nowadays is to to lease and why others take the plunge. machines offering a lot more memory for less money, means that the residual value of predicted with much confidence.

But far from depressing the third party leasing business, the new IBM machines have given it a boost, mainly because the fally easy to estimate.

However, the rapidly falling cost of rental charges on this equipment have not computer hardware, underlined by IBM's been changed as favourably as have the

maximise its revenues and profits by en-Couraging sales.

So a third party lessor can now afford to buy a machine from IBM and lease it at rates that compare well with IBM's rental

In this special section on Leasing and Second Users a leading IBM customer comments on why many users are reluctant

and in another article, the crucial problem of selecting the right sort of insurance cover for a leased or second user machine

In this opening article, Parry Mitchell, of United Leasing, outlines the history of the third party computer leasing business and gives his reasons why the future does not

Choosing the right time for investment By Parry Mitchell

leasing, it is necessary to choose ments. In the 360 era computer leasing companies ought to have made their major investments in 1967/68. Some did, but many continued into 1969/70 writing short period leases on equipment which evidently was about to be superseded by the 370.

I seree wholeheartedly with those who say that 370 lessors have learned very few lessons from the 360 experience.

I was a director and general manager of Standard Chartered Leasing between 1972 and 1976. stewardship was only to write leases incorporating a risk during the first year or two of 370 deliveries. Thoreafter, with elatively few exceptions, the risk which we took on the quipment was minimal. It was a policy which was difficult to maintain, particularly if one has salesmen out in the field trying to tie up apparently judey trains actions. But we stood fast and

one of the best leasing portfolios I hold no unique position in making good decisions in computer leasing. In Europe, Lease o and Citicorp also followed a similar pollow. exceptionally profitable for their

Many leasing companies. however, have, during the last two years, written leases which accorporate high residual values on 370 processors. I think that any risk taken on equipment leases written after 1975 represents questionable judgment by those lessors, and ! sand firm whether or not thuse lessors are protected by the licy. I am also fearful for those lessors, on both sides of the Allantic, which may have off-

The Lloyd's 'J' Policy was to his bad going for an industry investors in 370 risk which only started in the UK in becoming obsoler-equipment earnest in the early 1960s. Prior

insured that if they were in the ment which are patently ludic- stacked up in warehouses withbusiness of leasing IBM com- rous. puters, and if they conducted their business prudently and took conservative decisions on the residual values of equip- seven-year leases with a facility ment, and if when the equipto terminate after three years, ment was returned after the but subject to the provisions of primary period, the insured used the Lloyd's policy, may find due diligence in the marketing themselves in trouble. Much of machines, and then if after complying with these requirebanks which have supplied the ments, the unforeseen were to investment funding for the occur and the 370 equipment leases will find thomselves was worthless, then and only obliged to offer their customers then, would the investor be paid the implicit break facility in the contract, and that it will be the

Lloyd's has been in business for over 300 years. It has been very successful and has dealt with all manner of trading. An institution which has constantly made money out of shipping will not have the wool pulled over its eyes, and we can be certain that the imprudence of the decisions, it is well protected against any the equipment will endure and improdence from the parties it Institutions such as many of

the larger banks in the US, of them, however, may have a which have used the Lloyd's policy wisely, will probably never have to claim under it and the policy will have served its strategic airports throughout purpose. Unfortunately, there the world. have been many leasing companies which have had the teresting. In 1971/72 IBM facility to use the policy and started delivering its 370 sys-

similar policy in that their leasing portfolios were put to bed during 1973/74. All of these portfolios will turn out to be exceptionally profitable for the second portfolios will turn out to be exceptionally profitable for the second portfolios will turn out to be

banks thomselves, protecting

their good names, which will be

in 370 leasing will get their in-

fow sleepless nights wondering

how to market returned equip

Who will suffer in the end is that time of being placed, except open to dispute. It is true that at very low rates. It is true that lessees which have signed many of the companies in the computer leasing business went through cataclysmic times. Some went bankrupt, others were taken over, almost all of them had to take massive writemore likely, however, is that the offs in the value of their equiplike Greyhound Computer in the US, claimed to be the largest investor in 360 equipment, which has never taken any depreciation write-offs and has continuously made profits on its in 1973/74, the recession in

Fortunately for all parties the US caused many computer concerned, the 370 computer users to look again at 360 happens to be very marketable machines and this led to a - conforment. I believe that despite firming up in the value of this equipment. It is a process which has continued and the value of machines ever since has deall the parties who have invested lined on an arithmetic rather vestment back, plus profit. Some than a geometric basis.
If you look at the state of those 360 portfolios today you will see a very changed position.

ment located in warehouses at The 360 experience was inhealthy revenues and profits.

Boothe Computer, my old employer, is doing very well. Its 360 portfolio is written down to ost zero and is generating Leasco reversed its activities



Parry Mitchell le managing director of United Leasing.

computer leasing division, continues to generate good profits. DPF, one of the companies that was most severely affected and was close to bankruptcy, is now riding high and is a major con-

Series is quite clear. The initial nvestors were a little rash and a little optimistic but their marketing was good. They successfully overcame a major trough in the market, to the state where today they are now highly profitable. There was a blood bath but the army has been re-supplied and reequipped and is now winning new battles. So the question which now remains is, will the 370 leasing companies go through the same process? The answer as always both yes and no. The major nvestor in the 370 Series was Decimus, a subsidiary of the Bank of America. It invested in a very strong portfolio of equip-ment centred around the 370/

My contention on the 36

million. I am not privy to the structure of this portfolio nor to the length of leases, but I know the people who run the company and I am certain that it will remain profitable.

 The other major leasing companies include General Electric Credit, Itel and others. Once again their strength of management, combined with diversification policies, will ensure that their operations are suc-

158. The total value of this port-

folio was probably around \$750

How your bank can help

tion worth of new equipment purchased for British Industry was financed by members of the Equipment Leasing Association through leasing contracts. This compares with the figure of £288 million for 1915.

ceed £2,378 million and it is esend their customers unlimited new leases represents more than subliment during the firm term of the lease. The firm term in the UK in any one year. timated that the annual value of

becoming obsolete. In effect, to that leasing had been confined to such specialist equip-

LAST year more than £675 mil- ment as shoe-making machinery, copying equipment and telephone installations.

But a growing need to replace obsolete capital equipment and various periods of credit restrictions in the early sixties forced Assets currently on lease exnew plant. Leasing developed as an attractive and flexible altern Leasing is by no means a new

concept. It was common, we are told, in the advanced culture of the Middle East 5,000 years ago. Babylonia was well used to ship leasing in 2,000 BC and early. Greek culture saw leasing of the culture saw leasi slaves, mines and a factory

making shields.

The application of leasing in modern industrial civilisation has been rather less exotic but no less important. It really or- aid to equipment manufacturers ignated about a hundred years as well as a form of patent proago when the Bell Telephone Company and the American

Cost of assets purchased for lease by ELA members £m

1973 321 340 Cost of leased assets owned by ELA members

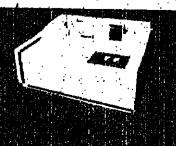
cided to lease, rather than sell, merchant banks and finance houses entered the equipment their equipment. This was regarded as a sales leasing field and marketed it as

tection and continued to be the most common until the 1960s. 1976 1977

The basic concept behind leasing is that it enables the lessee to acquire the use of capital equipment by making payments out of revenue. It

separates use of the equipment 1974 1975 from ownership, which distinguishes it from contracts such as a mortgage or a hirepurchase agreement, where the user either has ownership from the start, or has the option to 1,078 1,425 1,689 2,378 Turn to page 15

acquire it.



Junior Operator Wanted ... to know more about JCL and OS/VS - so we sent him to Infotech Operations Training. call John Blake for details

ufotech Operations Ltd.

LEASING AND SECOND USERS How can the user get | Tip-toeing through maximum DES LEE has been actively associated with the computer industry since 1962, when he worked with the National Coal

By Des Lee

succumbed to the sirens of the leasing company. In the good old days when the leasing companies were named after racing animals and gin, all they needed was a friendly bank and a secondhand IBM salesman and it more popular?" "Where does

proportions where others survived to evolve into the fullblown professional outfits that are evident today.

benefits?

Some major questions remain in the mind of the user like, "if leasing is so attractive why isn't

about flexibility?" "How will my own the item of equipment of

By definition leasing can be compared to the "oldest profession in the world." You own it, the market. Because of the acyou sell it and you still own it, tion of leasing companies, any suddenly they were in business.
Sadly some went to the wail in financing deals of over-ample

In those popular? Where does between leasing and other finance is in the simple fact that invariably you will never get to because the main difference new IBM mainframe announce-

about flexibility?" "How will my own the item of equipment of supplier react?" "What is the your dreams. Of course there are the leasing orders had been so the latest

Let us briefly examine the effect that leasing has had on ment is bound to be a sell-out simply because every user is invariably you will never get to going to order just to grab a

Purchase 3 Month 6 Month 12 Month Hire Hire

great that IBM now has to run a and greatest machine sitting in raffle to decide shipment order our computer room because

forthright views on the lot of the com-

may put in a "day one" order (in some cases day minus one) without regard to financing or benchmark performance in the hope that he or she will graciously be granted a position in the queue. Because of this, speculation is rife over what shape future announcements will take and, more important,

when the announcement will be

The blame, if that is the right word, for this situation must be laid at the door of the leasing companies because they can order two machines per month for unspecified delivery where you and I may be asking for one in 12 months' time. IBM quite rightly'demands a financial guarantee to ensure that their orders are not speculative but if a leasing firm's parent compuny happens to be a bank then it is not too difficult for it to get a guarantee, especially knowing that it is acquiring something which is bound to be highly

Thus, when the raffle takes place your one chance ranks against the leasing company's 24. There are no prizes for gues-24. There are no prizes for guessing the winner. Perhaps, if leasing companies had to iden-tify the final destinations of their machines at the time of order, like other users, then the latter

The other major impact that the leasing companies have on the market is to prolong the life of elderly computers, and many 360 systems are still in harness thanks to their efforts. By pro-longing the active life of the 360 and the early 370 systems by purchasing them when they are due for replacement and thus maintaining a high resale value, leasing companies make purchasing a machine that much more attractive for those that can afford to do so.

What are the advantages of

when we supposedly evaluate a The result of this is that a user machine we ensure that it is capable of performing our future known schedule, plus a little extra capacity for good luck!

Our deliberations apply equally to hardware and soft ware and if our chosen computer was good enough before announcement, why not two or three years afterwards? The major disadvantage is the fact that in this day and age, due to technological advancement, the majority of computer hardward announcements claim to give twice as much for half the price. It is the fear of this that inhibits the user's acceptance of leasing.

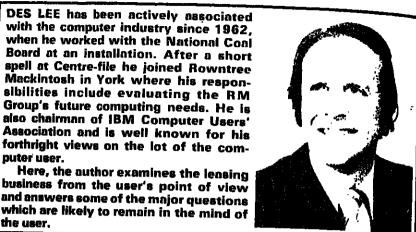
For example, if you enter a lease at 85% of current rental and quickly need more capacity, and an announcement is made doubling performance for the same money, then your investment could turn out to be sour. The other fear, that of revolutionary software change, died with the 370/155. All future announcements will be evolutionary rather than revolutionary. Will the computer manufac

panies? I don't think they will do so intentionally because we have already established that useful role to play in today's might stand a better chance in market. However, neither will they go out of their way to pro-tect them. One quick-fire announcement from IBM following hot on the heels of another with significant price advantages would cause severe embarrassment to leasing companies as they would be caught with expensive machines on tomers could be caught in the net as well, and that would be

Who then are the ideal leasing customers? I don't think you can typify any of them because all of leasing to the user? These vary with the leasing company and leasing company and leasing naturally favours those us who do lease do so for a leasing naturally favours those computing like the service bureaux, or those who requires second machine for back-up.

What, therefore as users, can we deduce? Leasing can be ben-eficial if you are prepared to risk the consequence of guessing wrong. Lessing favours those with growing workloads and static applications. It can also provide cost effective upgrades in light financial situations or a cheaper solution to a back-up problem.

Will we witness the demise of



By Alwyn Farey-Jones IBM's insurance clause in its manufacturer, the customer and

rental agreements is a model of the insurer. an insurance policy. It is only one sentence long and indemto the machinery, other than caused by nuclear reaction.

When you purchase or lease you have to organise the insu-

Unfortunately, most insurance policies are not as simple as the IBM clause, they often contain exceptions. You have the responsibility of setting a value to the equipment yourself. and your contract with the insurers will be set in a legal background which many would regard as being heavily weighted in favour of the

It is most important to relate the insurance contract to the maintenance contract and other contracts with IBM. Don't for get you will now have two parties to deal with, not just IRM You must consider the possibility that IBM will say "that is an insurance claim" and the insurer will say "that should be fixed under the maintenance agree-

IBM's contract says that you must have a stable power supply, so it is important that the surance contract doesn't ex clude "electrical disturbance" Nearly all policies will exclude damage due to withdrawn) of power supply by industrial ac-tion if warning is given, but many exclude even unexpected withdrawal of power. Sudden power surges or damage cumsed by out of sequence power down are a substantial cause of com-puter damage.

Beware of any exclusion for derangement. Although the manufacturer will mend a machine that goes wrong, a derangement exclusion opens the way for argument between the

So does an exclusion for de-

PROPERTY OF THE PROPERTY OF TH

fective design or manufacture, I nifles its customers against all know of one major bank which ikks of physical loss or damage spent 15 months pursuing unsuccessfully a claim against its insurers for damage to ferrite rings in a 360/65 memory. The insurers rejected the claim on rance yourself. This needs the grounds that it was either a careful thought by both data derangement or the design was processing and insurance defective. Under insurance law. the onus is on the insured to prove his loss, not on the insurer to show grounds for the rejection of the claim. In the end the bank swallowed the cost of the

new memory plane itself. Other exclusions to be careful of are for negligence, especially if there is a derangement exclusion as well, short-circuits and inductive effects.

What sum assured should you set for your equipment?

Will your insurance policy reinstate as new? If so the sum insured should probably be the new list price. Perhaps you are happy to receive a second user replacement? Indeed, for availability reasons, you may need to accept a second user replacement machine anyway. If so, perhaps the second user price may be the correct sum to insure, but not necessarily.

Take care that you and your insurer are of one mind. The situation for replacing a total loss is clear. However, unless you have a specific agreement the insurer may downgrade the claim paid for partial damage in the proportion that the sum insured bears to the value as new by the application of what is known in insurance jargon as

Average causes more illfeeling between the insured and the insurer than any other single doctrine, so it is worth explaining it from the insurer's point of view. Let me give a simplified example.

Supposing in a certain year, an insurer insures 1,000 new computers each worth £500,000

Buying or leasing a second-hand IBM system? In this article Alwyn Farey-Jones, managing director of Computer insurances Ltd, gives a timely warning to emember to take full account of the insurance aspect.

insurance minefield

Unlike when an IBM system is rented with its "catch all" insurance clause, buying or leasing means that the user must arrange its own insurance. And this is where the problems start. Farey-Jones gives a guided tour through the minefield and concludes by urging all DP

Now suppose his loss ex- re-instatement you will be paid perience for the year is typical and the cost of repair with new parts and manufacturer's labour $1 \log s \text{ of } £300,000 =$

2 losses of £100,000 =

8 losses of £25,000 =

£200,000

to the insurer to £375,000? There is no difference in the

risk conditions themselves due computer, so let's assume the same loss experience. Let us ignore inflation and assume the equipment repulrs cost the same

loss for the year of £275,000.
The standard way round this difficulty for the insurer is for his

managers to pick brokers who know about computers.

at a rate of .15%. The total premium is £500,000 × 1,000 × .15% policies to be subject to average, which means that if you pay

at that value.

only x% of any claim. £300,000

£200,000

Total C700,000 This leaves him an underwriting profit of £50,000 for the

Now what happens if five years later, all his clients reduce their sums insured by half to £250,000 each to reflect the second user value and thus reduce the total premium paid

apart from the biggest loss which is now treated as a total loss and replaced with a second-user machine at £250,000, then the total losses for the year are only £50,000 down at £650,000.

The total premium, though, has been cut in half to £375,000, the insurer has an underwriting

can be enormous. only x% of the premium for ful

The implication of this is that your broker should present to the insurer both the new replacement cost of the machine and the second user value and get a rate agreed that will pay partial loss claims in full, but consider any claim in excess of

If you are the user of a machine purchased or on third party lease new from IBM, you can still insure for market, ie second user value. In that case, there is an important discussion you should have with IBM -- in the nice language of which IBM is a master - about whether "marketing support" would be available as for a new muchine if to the decline in value of the you replace with a second user machine after an insurance loss.

If your computer is acquired on a lease it is possible that after a loss, you are still required to pay lease rentals in excess of what you would otherwise set as Now if the insurer pays out the costs of repair us now in full, the Insurance value of the machine. This also needs to be ruflected in your insurance cover. (You have this obligation If the loss is your fault even under an IBM rental contract. Is this liability reflected in your Insurance covers?)

This article is about the Insurace of second user machines so I will, only briefly, mention consequential loss insurance which

most of the major merchant banks offer a leasing service,

purchased, leased or rented by year as the nerve centres of heir enterprises. The effects of domage to a computer centre A message that has come through to us from our claims

should be the subject of very special analysis by the DP de case study file is that the time partment, the insurance depart taken to recover from a loss is ment and line departments, pergenerally greatly underestimated. Even if it is possible to haps with the aid of a specialist site for a modern database/data communications system at all, the sheer length of time involved

Choose an insurance broken that knows insurance, knows computers, knows the computer market place knows the Computer departments are manufacturer's contracts, and increasing their importance year you won't go far wrong.

Ht yema think ENVERT LINEDRY Kuranadi tilace the second user value a total loss most cost effective Provide disc

system from the world's leading supplier, and it's not from Inforex.

Think again! About cost effectiveness: from Inforex you can permanent place as a distinct financial facility which is now part of the financial mix of most get a complete three key-station system for under £10,000. Think delivery again: you could do away with punched cards progressive companies.

All the "big five" blearing by the end of the month. Think again about service: a banks (together with the main feliable, well proven range backed by a national service. a direct lessing subsidiary and available solution. The world's leading supplier, with over 4,500 systems worldwide, will take you from punched cards to key-to-disc (expandable to meet your most exacting requirements), to data management and to distributed processing with a compatible product range and the support to make it happen. Telephone inforex at 01-863 8311 or send the coupon for full details to: inforex Limited, Inforex House, Headstone Road, Harrow HA1 1PL.

lata Management Systems

think again!

Please send me further information on inforex key-to-disc

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DIABLO 1620 Hyterm 1641 HEWLETT PACKARD TERMINALS 2635A 26408 2641A APL/ASC11 2645A 2648A Graphics **LEAR SIEGLER** ADM IA NEWBURY 7001/2 VDU **TELETYPE 43** TEKTRONIX GRAPHIC DISPLAY TERMINALS 1013 ASC11/APL 4015-1 ASC11/APL 4631 Hard Copy Unit 4662 X-Y Plotter 4954 Graphic Tablet TRANSDATA 312 Reader/Punch Unit 305 Portable Terminal PAPER TAPE/PUNCH READER MAGNETIC TAPE CASSETTE UNITS
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the type of equipment. Naturally, it pays to shop around. By leasing you gain financial ben-efits, cheaper rental and no overshift rental in the case of an IBM machine. Your company's financial investment in an expensive computer can be unshackled to provide funds for other needs. You can protect against periodic price rises in rental. You can probably infor the same money. In carrain circumstances, you can even change squipment in mid-lease without penalties.

So what do you lose if you sign up for three, five or seven year? There is no advantage for a complete in the problems of getting a place in the queue if you are signed up will occur and profit margins for a lengthy period you may be will occur and profit margins of a lengthy period you may be will occur and profit margins out by the next IBM always be a market for a good change. But, after all, we are supposed to be DP professionals with three-year minds and want it.

交通,通过国际通过的

How your bank can help Under a leasing contract, therefore, the leasee has posses-

son and use of a specific asset on payment of specified rentals over a period, while the lessor realing ownership. Purthermore, the chosen by the lessee not the lessor (as distinct from straight-

lessor (as distinct from straightforward hiring when the assets
are usually bought by the plant
hire company before the user
appears on the scene).
The remtals paid by the lessee
to the kissor take into account a
humber of factors such as inyestment incentives, cost of
money, rate of Corporation Tax money, rate of Corporation Tax, including of rentals, etc. and easily the lessor to recover his capital outlay and make his profit over an agreed period, which is most

the right piece of equipment and only then fully evaluate the prosand cons of leasing against other forms of finance or outright purchase. See Figure 1, page 13.
One obvious advantage is that

leasing involves no charge on capital and the use of plant and equipment can be obtained without capital outlay. Assuming that the need for the asset has been established, the income generated by its use may well be sufficient to meet the series of rentals so that the commitment is self-liquidating.

Another advantage is that by fixing in advance the amount and requirily of the rental payments it helps considerably with coast flow forecasting and income series of the series of rentals and requirily of the rental payments it helps considerably with coast flow forecasting and income the lease over the lease over the lease of the asset over the lease contract, once it is allowed to site asset, the desiring industry is well the lease over the lease of the asset over the lease of the asset over the lease of the sease over the lease of the sease over the lease on the leasing industry is well the lease of the asset over the lease on the lease on the lease of the lease of the asset over the lease on the lease of the lease of the asset over the lease on the lease of the lease of the asset over the lease on the lease of the leas

Another advantage is that by fixing in advance the amount and regularity of the rental payments it helps considerably with east flow forecasting and foreign the lesse's ditention on the true cost of the asset over the expected period of use.

Once the period of the lesse is completed the seperation of use from ownership can lead to the severe thinking on any replace.

is nost commonly between is nost commonly between the had five years but can go up to ten years. At the end of this agreed will period the leases nor had he end of this agreed will be the option to continue to a secondary period at a much the growing at fact it is, classific leasing the leases of leasing in the fiel leasing the consider. clearer thinking on any replace-

able advantages over other school which inclines to sticking Since its establishment in this able advantages over other methods of obtaining new capital equipment. But any leasing company will tell you that the first thing to do is to make sure that you are choosing the right size of equipment and the make sure that you are choosing the right size of equipment and the size of equipment.

Since its establishment in this country some 15 years ago, leasing has earned for itself a permanent place as a distinct size of equipment.

Since its establishment in this country some 15 years ago, leasing has earned for itself a permanent place as a distinct size of equipment.

In this country some 15 years ago, leasing has earned for itself a permanent place as a distinct size of equipment.

In this country some 15 years ago, leasing has earned for itself a permanent place as a distinct size of equipment.

> Williams & Glyn's Leasing, for example, recently negotiated a lease for a major chemicals plant which took two years to con-

assured that the fixed nature of a lease contract, once it is er a lease contract, once it is the leasing industry is we agreed, applies to the leason as blaced in sustain the dramati woll as the lease. The facility growth that it has so far ax cannot be withdrawn or our perienced tailed in the event of a credit squeeze of changes in economic. Frequently Williams and Glyn's conditions.

Tim Palmer reports on the latest developments from Wang in the US Laboratories has grown fast by moving into is gambling on a powerful new product, the the low-cost small business and word pro-

cessing markets. A \$200 million company Tim Palmer reports from corporate head-

The hungrier firm that aims for \$1,000 million sales

Spanjaard. . . In terms of sheer numbers, the T processor is the strongest product, but the VP is coming up fast. Overall, our business in Europe is growing faster than our US business.

Wang systems through agents

and we have representations in

most countries apart from Iraq,

Libya and Algeria. We have de-

veloped our own Arabic and

Farsi printers but I doubt that

we will do an Arabic version of

the word processing software." Wang has no plans to manufac-

"We have a distribution

facility at Erpe-mere, just out-

side Brussels, and we manufac-

ture printer mechanisms in Tal-

Almost all Wang's manufac-

and as well as its own processors

and video terminals, it builds an

extensive range of matrix

printers, a drum plotter and

graphics display and is just moving into dalay wheel

printers. So far, none of the

peripherals has been sold on an

OEM basis, the company's full

production being required for

Although Wang started out in the scientific calculator market, the commercial, side is fast

taking over and now represents 60% of the business. Dr Wang

remains very much in control

the company and he and his

immediate family bwn 53% of

inches from his employees, not least for the new open-plant layout, which is a honeycomb of small offices separated by partitions just too high to see over.

"Any similarity to a Chinese maze is purely occidental."

sughs Harry Viens, director of marketing communications.

le is the butt of affectionate

sale with its own systems.

ring is done in Massachusetts,

ture in Europe.

who are concerned.

remaining 13% in the rest of the

"Germany is by far our big-

gest foreign market," sald Joop Spanjaard, vice president and

general manager of Wang's European and Middle Eastern

compete for the number two

spot behind Germany, but we

feel we should be able to get the

UK into clear number two posi-

"in terms of sheer numbers,

the T processor is the strongest

product, but the VP is coming up

ast, and overall our business in

Europe is growing faster than

Wang also has a strong con-

tion in the next year or so."

"The UK, France and Sweden

operations.

pany. That's what Wang calls itself. And that hunger manifests itself in a number of ways, notably a hunger to get its name as well known as that of IBM. This is not without reason, because Wang's achievements in the computer industry have

gone too much unnoticed.
But while the world at large has been looking the other way, Wang's customers have shown a loyalty to the company and its products which has carried it from an \$8.6 million company in 1966-67 to \$134 million in 1976-

This year is confidently forecast to outshine all previous years, with turnover for the year to June 30, 1978; topping the \$200 million mark, which would make founder and President Dr An Wang's target of \$1,000 million by the mid-1980s look eminently reachable.

Wang is not, however, playing safe and relying on its well-tried product line for continued success. Instead, last October it embarked on the biggest gamble in its history: a direct challenge to IBM in the small mainframe market. The vehicle for this challenge is a new machine which takes the approach that IBM is expected to follow in its orthcoming E-series.

Although designated the 2200 VS, the new system has a completely new processor, and has little in common with the other systems in the Wang product line, the 2200T, VP and MVP.

It is designed for transaction processing, and has an instruction set compatible with that of the IBM 360 and 370. Most of the instructions are the same as IBM, a few scientific ones have been omitted and a few have

Wang is pinning its faith on the new VS machine, and already some 25-30 have been installed with customers, the largest of these supporting 21 concurrent terminal users.

The VS had its European de-but at the Hanover Fair, is due to be launched in the UK at the beginning of July, and will also appear in Sicob in Paris.

tender for the growing word Wang is very strong in the US processing market, a unique small business systems market, product consisting of a network of Intel 8080 microprocessors with no central processing unit. defined as covering the IBM 5100, 5110, System 32 and System 34. One research organisa-tion gives it number two posi-"Word processing is a new tion to IBM with 22% compared

market for us in Europe," said Spanjaard, "We are only selling out of Paris, Frankfurt, Brussels with JBM's 29%. Nevertheless the company Amsterdam, Stockholm and does 43% of its business outside. London, So far, London has the US and this 43% is broken



angs word processing exclaims development contre at Lowell

today, Wang has ambitions to hit the quarters in Lowell, Massachusetts.

(oplow . . . we are working towards interfacing the word processing system to our com-

has no

PERHAPS the most noteworthy feature of the Wang word pro-cessing system is that it has no central processing unit. Instead, it takes the concept of distributed processing to its logical conclusion by distributing all the intelligence through the elements of the system, so that for example the basic WP10A stand-alone system includes Intel 8080s in the video terminal. the dual floppy disc unit and the printer. The line is exceptionally easy to upgrade, being simply a set of 8080-based peripheral modules. The WP20 takes up to three workstations and three printers, the WP25 adds hard discs of 1.5, 2.5 or 5 Megabyte capacities and the WP30 has a 10 viegabyte disc and supports up

As with the VS, the WP systems include 16 function keys on the keyboard for operator prompts and menus from which he desired operation is selected. Automatic document indexing and compilation of document statistics is supported, and the latest release of the software supports variable letter spacing.

"On a cost basis it makes no sense. In my opinion Europe is rapidly becoming obsolete as a Additional peripherals supported include optical character recognition, photo-composition manufacturing base: the Gerand intelligent copiers. mans seem to be the only ones

At present only one floppy disc terminal is supported, but local floppies at each terminal are to be introduced. "We program in PL/M and an assembler, and compilation takes four to five minutes on a native " said Harold Koplow, head of word processing research and development at towards interfacing the wordprocessing system to our com-puter line to offer an integrated

Koplow is an enthusiastic belever in the "office of the future" in which most of the operations done manually today are automated, word processors talk to each other over phone lines and videophone conferences between people thousands of miles apart are an everyday event.

He is also enthusiastic about the social impact that word processors are having at Wang. We use our systems intensively in-house. He added Former secretaries now either operate word processors or become administrative escietarité. oparate word-processors or pa-come administrative assistants and, as a result, we now have far more a romen managers in Wang than the average and 70% of our word processing sales people are women; as are half of our 30 or

so systems programmers."

the languages chosen for the muchine include ANSI-74 Cobol, and RPG II enhanced for intertaking it way up-market from its traditional business in the active working. Wang claims that the most interactive IBM Cobol programs need little or no conversion to run on the VS, and that the same applies to RPG II programs from IBM's System 3 line. Other languages are Basic, Macro-assembler, and a procedure language. Perhaps the biggest selling point for the VS is the extent to which it is designed to improve the productivity of

Architecture

changes

for virtual

processor

THE new virtual 2200 VS pro-

cessor from Wang marks a ma-

jor departure for the company.

Due for UK launch in July, the

2200 VS processor is completely

different from the 2200 T and VP

systems. The T is built around a

Basic interpreter and has no

operating system as such. It has

a 24 bit microword, 4 bit data

path and 8 bit fetch from

memory. The VP, and its multi-

processing MVP variant, have

the same 24 bit microword, an 8

bit data path and a 16 bit fetch

One thing at least the VS has

"Internally the VS has a 16 bit

in common with its predeces-

sors: an unconventional

architecture, with an additional

six bits of error correction code,

but externally to the program-

rom memory.

\$10,000 to \$80,000 segment.

Cobot programmers. One user with two 158s running 'ISO usked to do all his programming for the IBM machines on his 2200 VS claiming that he was getting a consistent 25% improvement in productivity," said McElroy. But we discourage this because it limits the user to a common subset of our Cobol and IBM's

The operating system is interactive, with copious prompts to the user. "It has a VSAM-like indexed access method, the main difference being that IBM splits blocks on overflow, where

"The file management system supports an optional record formut compression which is one example compressed 34 Megabytes into 22 Megabytes. Decompression is handled by the input-output processor. The interactive keyboard in

cludes 16 two-function keys and the processor is interrupt-driven from the work station. Detailed chunks of text appear on the screen to instruct the programmer or operator in how for example to define a protected field, and McElroy was convinced that programmers using the VS have no need of pencil and paper. For debugging, a symbolic facility puts up fiv lines of instructions on the screen, with the one that falled in the middle line.

run from the terminals.

faster than the IBM System 3 at about half the price." The minimum system costs

with 10 Megabytes on dis cost \$500.000.

In the UK the VS is due to be launched at the beginning of July, and Reg. Broughton, who has been appointed manager of the product, has been visiting vell to write software for it. "We have bases in London,

Rugby and Harrogate but we will be selling the VS just out of the London office to start with. and our initial aim is to get two or three large configurations up and running with customers,"

"In all we have about 150 people in the UK and will do £7-8 million this year: this would be an improvement of shout 70% over last year."

By JOHN GARRETT

il is far easier to look back on

technical change than look forward, Looking back we can see

fiaspart of a far broader history, and are able to identify social and economic processes that aused one technology to deve-

Looking forward, particularly

in a world as politically fluid as our own, with people's aspirations so varied, is a lot more difficult. Yet what the world makes of the two, and only two,

great technologies developed by

the computer industry will be decided by the social ideas and

economic forces that will gain

The two technologies, which I take to be digital information

(memory) and machine intel-

ligence (processing), have been

efined over a period of 20 years,

to such a degree that:

I All kinds of information,

from music to X-ray pictures to an individual's complete life his-

thus making all known data cap-

able of being processed by com-puter, and being rapidly and

2 Machine intelligence is now

cheap enough to be applied to a

huge and still-growing range of

decision-making activities that

could previously only be per-

formed by humans, or more in-

terestingly, were beyond human

There have been many other

nnovations in the computer in-

dustry aside from memory and

uses and developments of these

two technologies, and as such

are primarily responses to com-

mercial and other social press-

The tendency towards dis-

tributed processing, and dis-tributed databases, for example,

bas its main cause in the "revolt

of the user," or more accurately.

the response of local manage-

The large manufac-

turing companies

will see large com-

puter controlled

factories as salva-

tion from their de-

manding work-

we need to look at the ideas and

economic forces, both current

and beginning to emerge in the

manufacturing companies will

society we now live in.

universally communicated.

lop, and another to fail.

Third prize in the Computer try, Garrett was a project Weekly/Dataskil essay leader with the company, national, of London WC2. lopment. When he submitted his en-

competition, Computer- but has now been promoted style 2000, was awarded to to project manager with John Garrett (left) of CSI's American subsidiary, Computer Systems Inter- Computer Systems Deve-

His prize-winning essay

appears below. The entries by John Finnie of Solihull. Paul Holden of Dublin and Tony Thornton of Derby, which have won special awards, will be published in Computer Weekly in the near future.

By the year 2000 a divided society based on nineteenth century ideas

rialised nations do think about

the future, it tends to be perso-

nally directed to the effects on

their own way of life. In many

ways, this shows a healthy dis-

respect for the grand theorising

about the destiny of classes or

peoples that has so often encou-

raged politicians to ride rough-

shod over the desires of ordinary

people in the name of an un-

However, in the absence of

any new, genuinely popular

alterable historical purpose.

likewise will attempt to build more complex socio-economic models which after a further 22 years of program testing, they may even get to work. On a more serious note, the use of such models, with access to the vast quantities of social data available to the modern industrialised state, could prove a major threat to visible government and democratic decisionmaking. Such models have of background information, will already been used for far more than forecasting; indeed the ambitious objective of one was the complete control of production, fiscal policy and develop-

ment in a developing country. Stafford Beer described this system which he developed for the Allende government in Chile as a "system of here-and-now management of the economy that is now based on historical records, but on an immediate awareness of the state of affairs and the projection of that awareness into the short-term

To be effective, such models will take what they consider as corrective action, or in Beer's language, "algedonic feedback," in advance of any popular desire for change, or indeed appreciation of a problem. The role of popular decision-making, partiularly on the local level, is thus greatly reduced.

Advances in the capabilities of computers as well as developments in communications make such real time control by a government over an economy and its people feasible for the first time in human history. Computers, fortunately, are

not all on the side of the big battalions - the emergence of the microprocessor has seen to that. Personal computing is unlikely to be content for long with housekeeping jobs and TV games. The use of microprocessors in numerical control muchines gives a small engineering concern a vastly increased scope for producing a wide variety of component from relatively few machines. Craft skills such as embroider) or pottery could be enhanced by use of micro-controlled sewing

Computer and communications technology has something for everybody, and all kinds of people will seek to use it for all kinds of purposes. The large manufacturing machines or pottery wheels. The microprocessor, or rather cheup processing, will enable small enterprises to fill the wide gap between mass produced goods on the one hand and the see large computer controlled factories, with a widespread use inique work of an individual craftsman on the other. Multiof robotics for assembly line work, as salvation from their purpose computer-controlled machines could at last make the production of small batches of goods an economic proposition.

With regard to information and communications technology, the citizen could benefit enormously from the vast public database available through processor "supercomputers" to viewdata services. In adultion sonstruct house cybernetic information, these services model of the contine financial governments transactions, sending personal

messages, shopping, even When individuals in the industmedical and legal consultations. On a political level, viewdata services, if as widely distributed as television today, make referenda and other direct forms of democracy far more feasible. Many of the arguments against these forms of democracy, such as the technical problems in consulting all the people and the previously restricted availability

The advances of computer and communications technology are thus relevant to many different groups and interests in society. How, in practice, they will be used has very little to do with the creators of computer systems — their work has been done. The hardware and software designers have performed the role undertaken by the Guild craftsmen before the

lose much of their relevance.

social thinking, we have to conclude that the new technologies available to mankind will be used strictly in accordance with the mechanics of present both east and west.

-controlled sewing machines of pottery wheels.

The most inappropriate of

those nineteenth century ideas

is the "work ethic," the idea that

able bodied individuals should-

By the year 2000, factory and

office automation, increasingly computer-controlled, will have

led to a substantially reduced

workforce. There will be unem-

ployment because the altern-

ative, work sharing, has never been popular with employers.

The corporations will remain

keen, for competitive reasons,

on ways of increasing their workers productivity and will

and do work.

last industrial revolution - they

have created tools of a new age.

The stage of history we have reached is often called, particu-

larly by those in the electronics-based industries, the second in-dustrial revolution. If indeed we

can call it a revolution. What is

strikingly different with the first is the lack of any new widely-accepted social philosophies.

Despite the suffering and upheaval caused by the first industrial revolution, there was then a sense of history being made, of new classes being born,

made, of new classes being our, and even Utopian ideas of a future where the newly introduced machinery would finally free mankind from its daily toil.

But today, while there is still much social philosophy, new ideas have yet to find a response.

end up losing their historical society. And that means identity with the unemployed. implementing new technologies Work itself could easily bein the context of the nineteenth come more restrictive, with century ideas that underpin the those workers servicing the present industrialised world computerised offices and factories being on call for much longer periods. Their style of work will be that of present airline pilots or computer operators - periods of boredom with occasional peaks of frenzied

Office, laboratory and design-room work will be based on multi-purpose workstations. consisting of processor, master data entry device and interfaces for all kinds of communications and peripheral devices. A vast range of sense and display devices, often with their own processors and control software. will then be available. In the office, speech digitisers and document reader/writers will be common. In the laboratory and design-room, software will have developed to display and manipulate digitally-held representations of all types of matter and energy. To achieve this, graphics software will have become as large an industry as today's commercial DP.

press for work sharing schemes.

but as the notion of leisure loses

its rich and cultural associations

in the era of mass unemploy-

ment, their members may well

settle for other benefits, such as

child care facilities, perhaps

even domestic help. Rather than

unemployment being a tempo-

rary period in many workers'

lives, it could be a permanent

feature of some but entirely ab-

sent for others. With a smaller

number of jobs, especially for

the unskilled, competition for

work will be particularly fierce.

with those employed fighting

hard to maintain that status.

The unions themselves could

Workstations will probably be linked directly to databases, controlled by their own "back end" processors. The all-purpose various control and house keeping tasks, or to control and monitor work done at the independent workstations. But with so much data processing performed at source by the processor controlled workstation, most computer companies will probably have stopped producing mainframes, the larger seeking to dominate the huge worksta-tion and communication market, with the smaller custom-

out of arrays of small processors. World economic life will probably remain dominated by multi-national corporations, workers productivity and win siles of the private sector and siles want to keep a small and between the private sector and controllable workforce. Besides, hatlonal governments (in economy but will increasingly controllable workforce. Besides, hatlonal governments (in economy but will increasingly from eastern Europe, develop their own institutions as for the type of work required in creasingly from eastern Europe, develop their own institutions as for the type of work required in creasingly from eastern Europe, develop their own institutions as for the type of work required in creasingly from eastern Europe, develop their own institutions as for the type of work required in creasingly from eastern Europe.

building specialised machines

ployed, national governments will be mostly left-leaning, but recognising their dependence or the multi-nationals, may be somewhat ineffectual. Govern ments will seek to control in dustry by increasingly strict environmental and safety practions will exclude all but the large corporations from pro The hardware and

software designers have created the tools of a new age.

ducing sophisticated manufactured goods, and will provide the main spur to technical and market innovation in place of an increasingly disinterested con

In a world still based on the work ethic, the unemployed lacking the political and economic power enjoyed by workers, will be very allenated With protest ranging from "soft" graffiti in the public databases to more organised political activity, the unemployed will sever many of their links with the 'machine world." Suspicior of state medical services and social work agencies, with by then vast centralised databases. may lead to withdrawai from even the benevolent side of government service. Many people might prefer selfdiagnosis which may well be one of the facilities supplied by

The alternative movement which started in the US in the 1960s could well have developed no longer obtain identity from a job will eagerly seek land. With little point in living in Jobless cities, there could well be a drift back to new communities in the country, thus reversing the

What we are then likely to see in the year 2000 is a very divided society, created by the introduction of computer technology and automation in general, into a society based on nineteenth century ideas. Those in work will still be expected to work hard, and be committed to the corporation for which they work, and by present standards they will be generously rewarded. Those out of work will increasingly form a more identifiable class, with aspirations at odds with the esta-



McBiroy . . . the VS is four to five times feater than the IBM System 3 at about half the price.

"It uses 32 bit registers and 64 bit floating point registers, and virtual memory is handled by something similar to IBM's DAT box. Virtual memory is divided into 2K byte pages, and these are

organised in three segments.
"There are 128 pages for the operating system, 256 pages for re-entrant code and 256 pages Wang, "We are working for user code, Twenty-three users can be supported simultaneously and each can have up to one Megabyte of the

storage.

"All transfers to and from pherais are handled by the Intel 8080 or Zilog Z-80 based input-output processors, of which there can be up to five.
These handle all input-output
operations independently of the CPU once they have been initiated."

All the elements in the system are attached to a common proceasor command bus and a main memory bus, which should make it fairly simple to expand the capabilities of the system in the future

At present main memory is limited to 512K words, and disc storage extends to four 288. Megabyte drives, giving total online storage of 2,300 Macabites

With the VS targeted squarely at IBM, it is not surprising that

ment to their loss of power to the corporate centre. The ability to produce physically small computers, or to generate new con-cepts of database handling was of secondary importance. Looking ahead to the use of omputer and communication technologies in the year 2000, and assessing their effect on people's lives has little to do with alaloguing recent inventions, or even extrapolating trends in computer or terminal use. Like

Target areas for the VS are the large IBM System 3 base and 370 users who are in need of more power and want an interactive system. It supports one background batch stream plus spouling, and batch jobs can be

"The VS is four to five times

\$38,000 for a 64K byte processor input-output processor, 200 chps printer and the operating syltem. At the other end of the scale, a fully-configured VS with 512K bytes of main memory can

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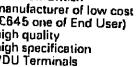
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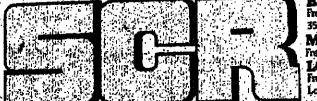
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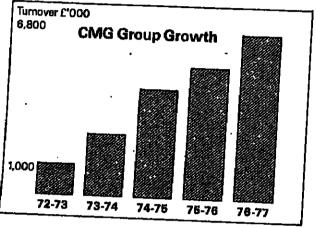
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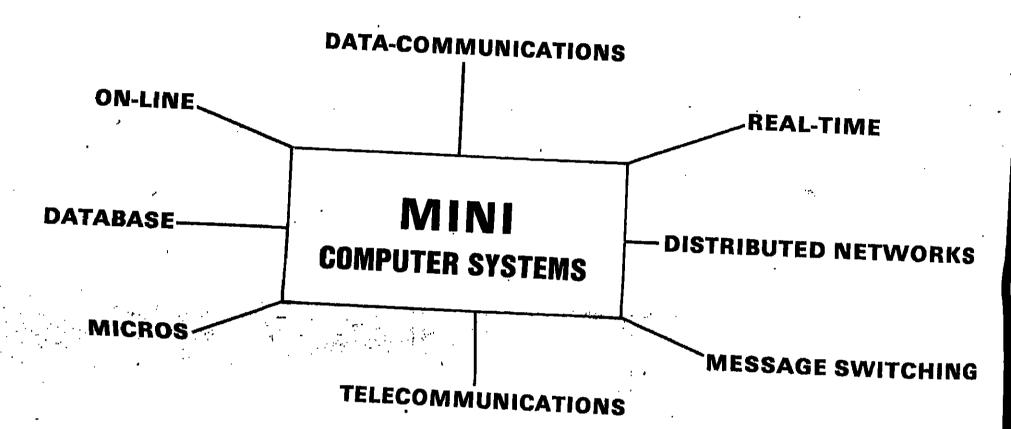
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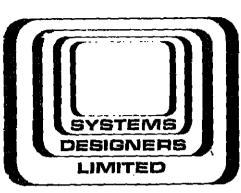
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THE Urban Traffic Control Systems Group is due to have a traffic control computer system using four Ferrenti Argus 700 S Computers included at the end of 1978. The period up to the eccaptance of this system will be used to ensure that the software is rigorously tested before commencing do-line operation. Commissioning of the system to control some 630. operation. Commissioning of the system to control some 630 traffic signals over most of the area of the County will follow.

traffic signals over most of the area of the County will follow.

The Group now needs a Santor Programmer Initially to work alongside the contractor to sid in this software integration testing of the system, subsequently he ship will be initially involved in commissioning the operational system on-line. Substantial further development of the system will follow.

For the first 8-8 months, the person appointed will work at the contractor's facility at Veytherbrawes; on delivery of the computer contractor in the contractor of Manchester adjacent to County Hall.

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Attractive conditions of service triglade removal: laggle ato expenses up to \$750; lodging slowance: (fexible working hours staff restaurant

Applications by letter, stating full defails (fictuding qualifications, experience, age, salety, and names and addresses of two referees to the County Personnel Officer, County, Hall, Plouding, Gardens, Management May 3MP by 3rd July 1878.



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supplements) This is a Joint Computer Unit, operated by Ashford Borough Council and Shapway District Council, which is located at Ashford with ICL 2903 computer.

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Systems Engineers

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Project Leaders

DP Managers

Systems Managers

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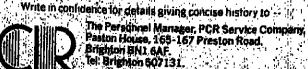
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Outside cable plant day to-day operation and maintenance (generation of pair illocation and cross-connection data on a real-time basis). Computer assisted operation and maintenance of long distance circuits.

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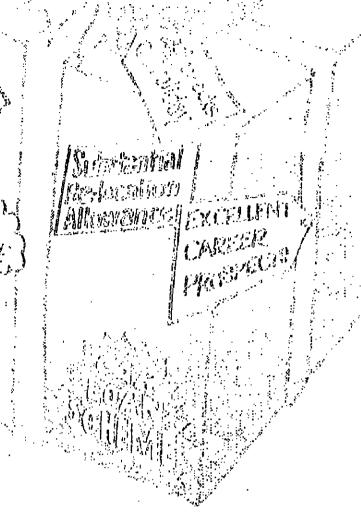
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Our client, a major organisation meeting the ground power needs of world's airlines, by engineering a broad range of products to client in more than 100 nations. Relaining Honeywell 62 / 40 under GCOS, they seek persons with 2-3 years' COBOL experience. Co. offers

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 * Variety of interesting applications with Honoywoll IMS package
- * Excellent Iringe benefits * Salary DFL 42-48000 (£12.000)
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be involved in a variety of commercial applica-

- * Beautiful offices in a pleasant part of Amster-
- * Opportunity to work in an expanding world-
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English-speaking environment
 * Salary 40,000 Guilders (£10,000)
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have various systems and programming assignments available in SWEDEN and GERMANY. Applicants must speak German or Swedish and have 3/4 years' COBOL/PLAN exp. on ICL

Overseas division of major international company

- * Variety of interesting and exciting projects On-line applications
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Communications and management
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- * Possibilities of travel throughout the Nother-
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- Excellent career prospects
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 Ref. 1547

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W. GERMANY

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- Rolocation expenses
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* Salary to DFL 60,000 (£15,000)

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- Scope in a variety of areas
- * Accommodation and expenses paid by com
- * Salary £12,000 c. TAX FREE

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- ★ Involvement in development of new projects * Opportunity to work with an expanding or-
- ganisation operating world wide Centrally based Amsterdam

SNR ANALYST

PROGRAMMER

* Salary 40,000 Guildors (£10,000) cost of living allowance and relocation expenses

Ref. 1212

DUTCH/BELGIUM BORDERS European division of American manufacturing co. seeks potential EDP Manager with personality, drive and enthusiasm for their PDP II installation. Applicant should have substantial amount of years in systems analysis and pro-gramming on PDP II's with a good working knowledge of MUMPS. He/sha will be involved

- * English-speaking co. * RSXII-M operating system planned for
- * RSXII-M operating a painting implementation early next year
 * Salary to DFL 55,000 (£14,000 approx.).

 Ref. 1545

PROGRAMMERS

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- Renewable one year permanent contract.
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- 30 day LEAVE per annum. Salary Paid in Bahrain Dollars £12,000 c TAX

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International company ongagod in manufac turing distribution and sales of well-known commercial products, requires person with experionce of oither inventory, stock control, warehousing or sales formasting systems. Suc-cossful candidate will form the company's distribution project and will be responsible for

- management information reporting. Excallent opportunity for cureor progression
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- * Company uses Sumens equipment compar-able to IBM 370

* Salary to 60,000 DEL (£15,000) + Bonus.

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- Relocation expenses. Working in new modern complex
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For further details telephone or write to our or write to our London Office: 01-734 0152/3010 (24 hrs.)

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A Dovelopment work on new sophisticated

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* Excellent perks include flexi hours and 6

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Our client, a sophisticated computer and techno-

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* Subsidised lunch, pension scheme plus other

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Salary to £4,500

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* Excellent opportunity to be trained on mini

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* Versatility of IBM Series / 1 in relation to IBM

Excellent cereer opportunities including chance of working with microcomputers
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TRAINING in systems generation
Salary £4,500 to start

LONDON

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Ref. 1586

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JUNIOR PROG

TRAINING in software

MINI PROGS

★ Wide range of projects
★ FLEXI HOURS

★ Salary to £6,000

* Excellent career prospects
* ANNUAL BONUS

Series / 1 mini computer

mainframe

SYSTEMS ANALYST JNR PROGS Challenging carons riwarts persons with approx

Our client, a prestigious Morchant Bankers are

Our client, a presugators where came to seeking a Systems Analyst who has treme at banking environment experience. They retain the BM 370 under OS but will consider other adward experience. Co. offers

- # Full banking benefits including subsidesed
- mortgage * Job security with prestign concern + Salary £7.500

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Ref. 1593

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- pace paing and interesting future development
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- # Greet promotional prospects
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MIDLANDS AND NORTH ENGLAND

Ref. 1586

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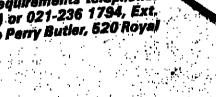
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MINI PROGS

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- ★ Extensive training up-to-date technology
- * Excellent career opportunities * Training in RSX, RTII and RSTS * Chance to travel abroad
- * Salary £6,000-£10,000 p.a

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Computer

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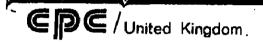
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West of Scotland

The System/Data Processing Department is responsible for the investigation; preparation; and implementation of systems and procedures for manual and computerised applications. A wide range of projects ensures that the work is challenging and rewarding. In particular the department is currently concerned with the installation of on-line VDU systems related to the imminent installation of a DIGITAL EQUIPMENT COMPANY PDP 11/60. Applications being developed include production planning and scheduling and materials control. Future developments will include Standard Costing, Plant Maintenance, Personnel, Quality Control.

Applications are invited from a wide range of systems staff, with or without programming experience, who can show ability and willingness to work with a minimum of direction and can meet the needs of users at all levels.

Candidates seeking opportunity, security and large com-pany benefits who meet the requirements should write for application form to:

The Personnel Adviser (Administration), CPC (United Kingdom) Ltd., Faiside Road, Paisley. Tel: 041-884 5111, Ext.

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SUPERVISORY TECHNICAL AUTHOR S.W. MIDDX. C. £7000

Our clients are a large manufacturing and marketing organisation. Their international business development group, based in London and Paris, is expanding at 30% p.a. Publications are of a high-quality professional standard, with an emphasis on comprehension by non-technical

To maintain and improve the Group's publica-tions, they now seek a Technical Author with the ability to supervise a growing team. Additionally,

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Diearn computing (or increase your know-tedge) and use computers for text editing Omake occasional short visits to France and elsewhere abroad

The opening will appeal to experienced Technical Authors, not necessarily with a computing back-ground, who are able to express themselves clearly and concisely in English, and to supervise staff. Candidates should be well educated (ideally a degree or professional qualification) and should have had significant relevant experience.

Please ring us in confidence for an initial discussion, quoting ref. 888. Alternatively, leave a message on our answering machine



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Two Senior Support Staff Required £7000 and £5400 plus car and bonus.

From 1st October 1978 the QPAC Payroll System will be supported by QPAC Services Ltd. from new offices in Maidenhead. The company will be introducing the extended facilities of the most widely used payroll system in the English speaking world as well as other packages.

Support staff are required from 1st September to train users and instal the packages: A knowledge of QPAC is a distinct advantage. Applications should be in writing following the layout of any usual application form to:

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Applications are invited for a research post at University College London on a four-year programme, of research on taxe you, incentives and the distribution of income. The programme is financed by the SSRC and directed by Prolessors A. B. Attenson of UCL. M. A. King, of Similarisam, and N. H. Stern, of Warvick, The work will involve a stitustantial element of computing, particularly handing large-scale auries desired in the or in sponometric research would be valuable. The saturation will be to the saturation of the saturation o

Further details nive be objected from Pyddasar Bernall Pyddasar Birthiad Footback Cay Lact of Political Economy, University College Landon, Money Stract London Walls Est.

ECONOMICS tou would join a group which is vitally concerned with both senior management at sales force in supporting corporate marketing objectives. Areas of responsibility would include the analysis of market conditions, the status of competitors and the faunching of new products

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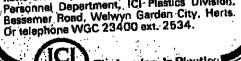
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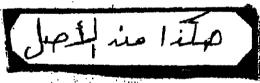
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683 Closing date for applications 10 July 1978 NATURAL ENVIRONMENT RESEARCH COUNCIL

WANTED TRAINER BALES PERSON BALLER highly molives for enrichmistic highly molives and maked padestries and re-inception. Ten your expensions of the light in compelical and pub-les are light in compelical and pub-les are lightly and related task to people

COMPUTER PROGRAMMER/ANALYST Aberdeen North Sea Oil

Occidental, one of the most pro-gressive and successful oil companies operating in the North Sea, have a small, highly-skilled team of com-puter specialists, who play a signi-ficant role in providing technical and commercial data processing

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Candidates, male or female, should have an engineering degree and a minimum of 4 years experience in technical data processing preferably including a chemical sharing and

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SALESMAN

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PROGRAMMERS

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We require experienced computer professionals and juniors with ambition, energy and drive to share in our challenging

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Board is responsible for supplying electricity to over 25% of the landmass of Great Britain. We know our business and do our job well. Our accounting and engineering departments make extensive use of our computers and are now expanding their computer based activities

he money?

The panel opposite gives an idea of the salary scales we are offering, but the actual salary will depend entirely on you. Your experience and ability are what we need and we are willing to pay for it. If you are looking for a real career with opportunities for advancement in a growing organisation look no further. Assistance will be given with moving expenses where necessary.

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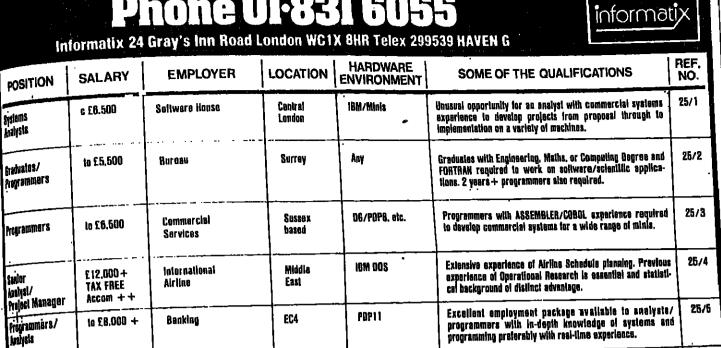
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te £11.000

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PROGRAMMERS

With a background of analysis and programming and experience in leading a team of at least six. Capable of organising turnkey systems including implementation and training.

Experienced in writing detailed systems and programming specifications and able to deal with first-time users in an overseas and able to deal with first-time users in an overseas and able to deal with first-time users in an

Who can cope with challenging projects within this Software House. Languages are immaterial although much of the work is based on Minis and a knowledge of BASIC would be an advantage.

Generous gverses attowerces and accommodation are available whilst working abroad. Interviews are being held throughout the months of June and July and offers will be made to successful candidates.

THE SALES BIT

Resistance to change

particularly with first-time and compile a master-list of users, many of the objec- answers to the kind of tions put forward are symptomatic of resistance to come across?

There are usually two puters. reasons why people object to change: either it makes problems at present. them feel insecure or it creates an apparently unnecessary hassle, or both. agree. The introduction of new ideas and methods can also this before. vestment, politics — and so are adequate.

In such a situation it is our present systems. necessary for the salesman viii: We don't have any to gear his selling strategy towards motivating the client into a positive frame This can only be done by convincing the client that the changes being proposed will be to the ultimate ben-efit of his company and xiv: I'm far too busy to get

creates its own special sideration. "flak," which comes in the xvi: Our requirements are

objections. XVIII It's IT's The salesman's best way it's worth. of handling such reactions is to establish his own list of likely objections and also to creat a corresponding list of having our files off the pre"BUT IF" rebuttals, which mises. can be called on when the xx: We just took delivery of

counter them with. Then in touch! why not get together with

We're not ready for com-

i: We have too many other lii: It will cost too much. iv: The unions will never

bring extra work, risk, invil: We will have to change

ix: Who else has installed such a system? of mind. He must work x: We have a computer at towards overcoming the in- head office. ertia that the prospect of xi: Your system wouldn't change can bring about.
The can only be done by xii: That doesn't apply to

xiii: That's against com-

Resistance to change xv. We'll give it some coninvolved

form of a wide variety of unique.

A physicians wide variety of unique.

Explications with the common transfer and the common

a computer system from Here are a few objections one of your competitors. to start you off. See what Ah well, you can't win "BUT IF" rebuttals you can them all — but you can keep

Opportunities in the Midlands

swinging back the other way and Midland companios were again buying their own hardware. Many computers were un-necessary and invested in

minicomputers.

If they needed no more than separate computers to deal with, say, invoicing and wages, it was not difficult to

to suit their particular This diversity provides an abundance of choice for computer staff coming to the Midlands, as David

Cross, Careers Officer for Aston University in Birmingham, confirmed. "We are finding an absolutely astronomical demand from people with large installations down to people who are going into the

microprocessor field. The demand is very wide," he tion of people who are pre-pared to take on staff and then train them from

scratch, but we never have any difficulty in finding jobs. It is a long time since I had an unemployed computer scientist on the Aston University is une-

quivocally oriented towards sclence and technology and lue to the current boom in the Midlands and elsewhere, it has reacted by 9 (because Y and L are starting a new course.

students at Aston could -calculation is well on its take an honours degree way. The solution is, in fact, with a computer science 457 + 9,623 + 3,501 option where it would be 13.581.

combined with such subjects as maths, business studies, architecture and

urban planning.
The newly started course was a BSc in computer science, from which students would start gradu-

ating in three years' time."I think this was created as a response to the demand, said Cross. A spokesman for the Uni-

versity of Birmingham said it had "an enormous com-"We do a lot of teaching,

both for people going into the computer business and for people going into other walks of life who want to know about computers," he

The use of computers has exploded in the field of research, for which the University is renowned, and it therefore employs a number of computer staff of its own. A new interactive propor- is to be installed at Birmingham Universit next year.

Puzzle answer

E is clearly 1, and this helps considerably with the analysis of the units column. Y and L can only be 1,3,7 or 9, since BOY and GIRL are

E = I rules out I and also Cross explained that must surely be 8 or 9, so the

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VI Recruitment

Ascii through the Logic Gate An epic in 32K words, by Richard Forsyth

Block 3 (The Inter-Block Gap)

her ride. Thus, with Hex cantering alongside, they Bootstrap's dope vector. Hex has hooked up Ascil over an asynchronous serial interface bumped and joited their bowl of a small circula and is driving him by remote way through the night, crater, possibly volcanic control for fear that his own logic circuits have been mostly uphill.

As they veered and swerved their way from the log cabin, Hex several times turned Ascil in the wrong Cleo, and once sent him charging full astern, higher. In front of them, breaking the data link and stretched out in the sunrise, causing a costly delay while was a magnificent view he ran back to retrieve the over the fertile plain. Cleo

dog.
"It's not very easy dust from her dress. "Where steering him," Hex said defensively. "He investigates do we go from here?" she asked. on polar co-ordinates. whereas I'm a Cartesian

Cleo just rubbed her some shelter and maybe try bruises in silence.

"This is not going very well," thought Hex. "I was supposed to be riding to her rescue on my shining charger but instead she contained to devise a plan of ac-

rescued me, and now it tion." looks as though I'm holding her back." Unfortunately the split-second lapse in concentration caused by this thought was enough to send Ascii plunging off the ledge where they might be path again.

He careered wildly across the uneven ground and then vertical rock. Hex shrugged and, adjuddered to a halt buried nosc-deep in some loose gravel. Hex tugged at his to his head and helped push. ning Ascii through 180 de-With some effort they managed to extricute him and roll him back onto the

Accil's four-wheel drive; and neaved for all he was and once they were out of sight of Sprocket's Hole he turned on the headlamps so that they could at least see where they were going. Their progress, which had been extremely erratic, began to pick up and the ten. gan to pick up, and the tengered down into the hole without opening her eyes.

Sam. Hex turned it over sion between them eased. When he felt he had mastnto which they had vanished so suddenly ered the technique, he offered her a lift on Ascil's

"All right," she said, climbing aboard, "I'll try

ward, his wheels churning up a spray of dirt. Cleo hung on with one hand, waving

cleo has engineered Hex's the other above her head. on a bank of soft green moss release from captivity in She seemed to be enjoying just ahead of the point where she had come to rest

bumped and jolted their bowl of a small circular with steep rock walls all As dawn was breaking round and a tiny lake, they came to the crest of yet another hill. They had now attained a height of 2,903 crater's bed was covered in metres and on both sides a bright green moss, and a the mountains of the single monkey-puzzle tree direction, bumping into southern Sierra Nueva grew by the side of the (New Range) towered even pond.

Hex's eyes met hers. "I think I found an inter-block gap," he said, smiling.
"Not a bad little hiding

dismounted and shook the place," she replied.
They rolled Ascii out into the sunshine to re-charge "That's what we had betdown to the water to drink ter decide now," sald Hex. "I think we should first find Cleo guiped it down greedily, though it was ice cold for she was very thirsty. Having slaked their thirsts, to get some sleep. We're they returned to the side of

tunnel and sat down.
"What shall I call you?" asked Cleo out of the blue. We've never been intro-They moved off the trail duced. I know you're the and climbed a short distance into the hills. Hex had a bit of a mouthful." hoped to find a little cave or

Hex, but my real name is ledge where they might be sale from observation, but Samuel Synapse." "I'm going to call you

before long they were met Sam then," she declared by a sheer wall of almost with deliberation. "That suits me," he

mitting defeat, began the full name?"
difficult manoeuvre of tur"My full "My full name is even fuller than yours, I'm afraid. path.
Gradually Hex began to get the knack of controlling Ascil's four-wheel drive:
Ascil's four-wheel drive:

Wedged his shoulder under Cleopatra Calculus, but I'd prefer it if you'd just stick to Cleo. Now, if you don't mind, Sam, I'm going to get

shed so suddenly.

"Are you all right?" she seemed as good a way as called.
Hex's answer echoed life. But he was too sleepy to back: "Yes, come on in. It's pursue that train of just what we were looking thought, and drifted off into

"Ready?"

"Chocks away!"

"Chocks away!"

Hex revved Ascil up to Soon she too was sliding full throttle, and let go of headlong down a long dark the brake. Ascil leapt for chute. Then she burst out ward hit where the property of the light again at the week.

1, 1978, Richard Forsyth, Rair

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